ROBERT ROBINSON'S ALPHABET AND SEVENTEENTH-CENTURY ENGLISH PHONETICS

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The first phonetic alphabet for English, published by Robert Robinson in 1617, is analyzed, along with the forces which led to its invention. The English spelling system, generally considered to be the most irregular and inconsistent of any in the world, was reaching its present state in the seventeenth century. Robinson gives the irregularity of the English spelling system as his reason for inventing an auxiliary alphabet to help foreigners and children learn to read English.

English spelling appears to be irregular for two reasons: first, it contains genuine irregularities as the result of borrowing words from other languages with their spellings intact, so that English words reflect the spelling systems of several languages; and, second, insofar as English spelling is regular, it corresponds not to a phonetic or phonemic level, but to the more abstract morphophonemic, or

phonological level. The primary sources of English spelling are Old English, French (from Modern French loan words as well as from Old French or Anglo-Norman), and Latin. The irregularity results from the translation of loan words into English pronunciation with no accompanying change in the spelling. Many apparent irregularities of English spelling result from the fact that English spelling corresponds to a deeper level of phonology than the pronunciation: the use of the same vowel spelling in sane-sanity reflects the morphophonemic similarity of the words. Generative and stratificational phonology are similar in giving a consistent representation of this level, although they differ in most other respects.

In his alphabet and transcriptions of English, Robinson suggests the notions of an abstract phoneme for English and of phonemic voice. Although the phoneme has been rejected by generative linguistics, it can be redefined without the procedural bias of American structural linguistics so that it is acceptable to post-Chomskyan linguistics. The more abstract phonemic is in fact a necessary part of stratificational linguistics. Phonemic voice occurs in English in obstruent clusters. The separation of phonemic voice from the obstruent clusters is accompanied by neutralization of the morphons (or morphophonemes) underlying the phonemes, which results in the presence of archiphoenemes for the obstruents of English.

Robinson actually uses aspiration to indicate devoicing in his alphabet and transcriptions. He uses what is in effect a devoicing phoneme at the same level of abstraction and with the same accompanying neutralization as occur in the analysis of English obstruents with phonemic voice. Robinson's treatment of phonemic devoicing, or aspiration, has problems involving the sonants involved in English consonant clusters and consistency of application as devoicing; the same symbol is used for devoicing and initial [u]. When he errs, Robinson generally errs on the side of oversimplification, using too few symbols rather than too many. His apparent intention is to create an alphabet and system of transcription that correspond to an abstract phonemic level like that of stratificational or Prague school linguistics.

In terms of the relationship of alphabetic spelling to phonological theory, the presence of a phonemic as well as a morphophonemic level makes the proponents of the theory less likely to declare a single orthographic principle than the proponents of theories which have only one consistent level.

Chairman

INTRODUCTION

This is a dissertation in the history of linquistics. It had its genesis in a combination of interests--history of the English language, phonological theory, and the relationship of sound and spelling in English. The early Modern English period offers ample opportunity for all these interests. In fact, it seems to combine them at every turn, for the sixteenth and seventeenth centuries produced the first spelling reformers and the first phoneticians in English; phonetics was usually the outcome of proposals for spelling reform. John Cheke, Thomas Smith, John Hart, and William Bullokar combine to form a group of spelling reformers covering the last half of the sixteenth century. Robert Robinson, whose alphabet (1617) is the first auxiliary phonetic alphabet for English (not intended to replace standard orthography), is placed at the end of this line by Dobson (1968), although Robinson is not a spelling reformer. Robinson writes with apparent awareness of the general feeling for spelling reform; his alphabet, he says, is to make up for the defects of standard English orthography.

The impetus for spelling reform in English comes from the reform in the pronunciation of classical and Homeric Greek in the universities, usually associated with

the name of Erasmus. Greek had long been taught with the pronunciation of contemporary Greek, but Erasmus and other classical scholars, including John Cheke and Thomas Smith at Cambridge, argued for a pronunciation nearer that indicated by the spelling of Greek. In the conservative academic pronunciation, for example, the vowel letters η, ι, υ, and the digraphs αι and αυ, were pronounced with the value of Italian i. The Erasmian pronunciation postulated three distinct vowels and two diphthongs (Cheke, 1555). The chancellor of Cambridge, Stephen Gardiner, issued an edict in 1542 forbidding the use of the new pronunciation by teachers or students. There followed an exchange of letters between Cheke and Smith, and Gardiner. Cheke finally left England for the continent, and took his own letters and Gardiner's (including the edict of 1542). He published them all at Basel in 1555, under the title De pronuntiatione linguae Graecae (Drerup, 1930: 93-95). Cheke and Smith are exceptionally important because they figure prominently in the controversy over Greek, and they began the tradition of spelling reform in English.

Although Robinson nowhere mentions any predecessors in phonetics, his alphabet itself suggests his knowledge of Greek, and he apparently matriculated at Cambridge in 1615, sixty years after Cheke's publication of his letters. Robinson must then have been aware of the controversy and must have seen the results of the ultimate success of the Erasmian pronunciation of Greek (see Chapter V). Robinson

seems to fit at the end of a tradition which was at the same time the first movement for English spelling reform and the first English school of phonetics.

The English spelling system has the reputation of being among the most inconsistent and unphonetic in the world, and it evidently owes some of its present reputation to early Modern English. In fact, the English spelling system had reached its present state by the end of the early Modern period. The questions present themselves: how inconsistent is the English spelling system, and how did it arrive at its present state of inconsistency? In Chapter I, I shall attempt to answer these questions. In this chapter, I shall trace the development of the English spelling system from its beginnings in the Old English period through the French influence on Middle English and the Latinizing of the early Renaissance, the influences that gave English the variety of alternate spellings that it contained in early Modern English.

In Chapter II, I shall deal with the relationship between alphabetic writing and the two dominant American theories of phonology--generative and stratificational phonology--along with their predecessors, American structuralism and Prague school phonology. This chapter will be a comparison of the two theories as they relate to English orthography.

In Chapter III, I shall examine the theoretical status of the phoneme in generative theory, which generally

rejects it, and stratificational theory, which accepts it. The phoneme as defined by stratificational phonology is the basis for Chapter IV, and I shall analyze the notion of phonemic voice in English obstruent clusters.

Robinson's transcriptions indicate that he used the term aspiration to indicate something like the modern concept of phonemic voice in consonants and consonant clusters. In Chapter V, I shall analyze Robinson's alphabet and transcriptions; and in Chapter VI, I shall examine Robinson's system of phonology, based on the evidence we have.

Finally, I shall give consideration to the effects of an essentially descriptive phonology like that of Robinson or of the stratification linquists on the notion of the relationship between phonology and spelling.

CHAPTER I

THE SOURCES OF THE ENGLISH SPELLING SYSTEM

In this chapter I shall examine the development of English spelling and try to explain why the orthographic system of English in the early Modern English period prompted the first attempts at spelling reform in English. There were clear causes for these attempts other than the irregularity of the spelling, for example, the impetus for reform arising from the controversy over the pronunciation of classical Greek mentioned in the Introduction.

The early spelling reformers all considered the ideal spelling system to be phonetic or phonemic. King (1969: 213) comments that "spelling reformers seem to make the best autonomous phonemicists." Although the notion that spelling should reflect etymology was plainly being put into practice during the fifteenth and sixteenth centuries in the Latinization of the spelling of words like nation (Middle English nacion), the notion does not appear in the writings of orthoepists until the eighteenth century (Elphinston, 1795). The earliest spelling reformers in English, Sir John Cheke and Sir Thomas Smith, however, being classical scholars, must have been aware that Latinization was one of the contributing factors in the irregularity of English spelling. This awareness was

undoubtedly one of the factors which motivated Cheke's desire (Cheke, 1561) to avoid foreign words in writing English.

Considered as a phonetic representation, English spelling has been irregular since the Middle English period, but it has been irregular in two different senses. Middle English spelling was more or less phonetic in the sense that the same sound tended to be spelled in the same way whenever it occurred, although there were often variant spellings of the same sound, as in the spelling of the word peace below. A given spelling generally indicated the same sound wherever it occurred. In Modern English, spelling has come to represent the same word with the same letters whenever it occurs (see Jespersen, 1909, I:3). In Middle English pes, pees, and pais all represented the same word, 'peace'; e, ee, and ai all represented long open [ɛ:].[1] In Modern English the influence of printing and etymology have combined to change the system so that a particular word is spelled the same way every time it occurs, although a different word with the same sound might be spelled differently. The vowels of wait and name have been identical since the seventeenth century, but their spellings have been frozen, so that they are always kept separate orthographically.

A number of influences can be found in the makeup of Middle and Modern English spelling. The foundation of English spelling was, of course, laid in the Old English

period when the alphabet of the Roman missionaries was combined with the Irish alphabet to represent Old English phonology. Old English spelling seems to have been quite regular, but the Norman Conquest brought with it an enormous number of loan words, their French spellings intact, which added variant spellings for many sounds of English (for instance, the ai spelling for [ę:] in pais, 'peace,' above). French influence was responsible for a number of changes in the spelling system of English, changes which affected native words as well as loan words, such as the use of u to represent the vowel [y] and sch, rather than Old English sc, to represent [s]. Middle English spelling, which I shall discuss in detail below, is a combination of the Old English system with the Old French system.

After the complication of the English spelling system by the influence of French, the sound-spelling relationship was made more irregular during the fifteenth and sixteenth centuries by the sound changes that mark the difference between Middle and Modern English. The Great Vowel Shift itself was a regular sound change and left consistent, although different, sound-spelling correspondences. Many of the changes, however, involved the consonants, such as the loss of initial velar stops before n as in knight and gnat, which left a residue in Modern English spelling.

Along with the vowel shift and other sound changes, the tremendous number of loan words from Latin further complicated the spelling of English. Not only were words

borrowed from Latin with the original spelling intact, but many words already in the language which were originally Latin were respelled according to Latin principles. The b in debt was introduced apparently to reflect the Latin; the word had been spelled more phonetically as dette in Middle English.

It has sometimes been suggested that the irregularities of English spelling are the result of sound changes, like the Great Vowel Shift, without accompanying changes in spelling, but this explanation is not strictly true. It is rather spelling change unrelated to sound change that has made the system irregular. I shall return presently to a detailed examination of the factors outlined above.

In any study involving the development of English phonology, as this one is, the monuments of English philology, Luick's Historische Grammatik (1921), and Jordan's Handbuch der mittel-englishen Grammatik (1934), are indispensable. Many philological works of smaller scope are valuable since, in examining the evidence of early English sound change, they catalog and organize many samples of spelling. Among these works are Neumann's (1904), Lekebusch's (1906), and Kjerrstrom's (1946). Among the histories of English, Wyld's History of colloquial English (1936) must be singled out for the thoroughness of its treatment of the fifteenth century, a crucial period for the development of English spelling as well as English pronunciation.

Few philologists or linquists have actually done more than suggest the outline of the development of English spelling. Jespersen (1909) sketches its development, but he is clearly more interested in the development of English phonology than of English spelling. William A. Craigie has been concerned with spelling, however, rather than phonology. His book on English spelling (1927) is primarily concerned with the spelling of Modern English, but it suggests that the origin and history of a word are indicated by its spelling. Craigie's pamphlet, Some anomalies of English spelling (1942), is concerned exclusively with the history of English spelling, but, as its title suggests, it is incomplete. Craigie has also adopted an alphabetic organization, listing each spelling and its sources. While this organization makes clear the history of each spelling treated (vowel, consonant, or digraph), it tends to obscure many of the general relationships among the phonology, sound change, and the spelling system.

More recently, Richard Venezky (1965) has examined the background of Modern English spelling in his Ph.D. dissertation. Venezky has organized his work alphabetically by 'spelling units': letters of combinations of letters (like th or sh) which are used as units. His treatment of the development of the consonantal spelling units is generally excellent, but the alphabetical organization, like that of Craigie's work, seems to hinder a full treatment of the vowel spellings, and he has little to say about the

occurrence of double consonant letters. Venezky is also primarily interested in the spelling-to-sound correspondences of present-day English, and these correspondences differ, if only slightly, from those of early Modern English. Nevertheless, my debt to Venezky's work will become plain as I proceed.

Many other sources not concerned directly with orthography--or, for that matter, necessarily with English--will be cited in the course of this chapter. Of these, two are of exceptional importance. Mary Serjeantson's (1936) study of the loan words in English is invaluable, and Margaret K. Pope's From Latin to Modern French (1934) contains one of the few recent treatments of Anglo-Norman phonology.

I shall turn first to the spelling system of Old English, which, after the sound changes between Old and Middle English, formed the basis for Middle English spelling. I shall examine the phonology and spelling of loan words from Anglo-Norman and Old French along with the scribal changes effected by French scribes. These elements are combined in the spelling of Middle English. From Middle English spelling I shall turn to the sound changes that mark the distinction between Middle and Modern English. These changes, along with the fixation of English spelling word by word and the influence of classical Latin, formed Modern English spelling much as we know it today.

The Old English alphabet was a combination of the alphabet introduced by Roman missionaries and the Irish alphabet (Jensen, 1969: 531). It had four letters not to be found in the Modern English alphabet: consonant letters thorn (þ), eth (ð), and wynn (ƿ), and the vowel letter ash (æ). þ and ð both represented both [θ] and [ð]; ƿ represented [w]; and [æ] represented the same low front vowel (as in cat) that it represents in modern phonetic alphabets. The letters k and z did not occur in Old English except in occasional loan words.

Some of the consonant letters represented sounds different from those they represent in Modern English. c and g represented the voiceless and voiced velar stops [k] and [g], respectively, in conjunction with low front and back front, as in candel, 'candle,' and gād, 'goad.' The same letters represented the affricate [č] and the palatal glide [j], respectively, in conjunction with mid and high vowels and diphthongs, as in ceorl, 'churl,' and gea, 'yea.'[2] g also represented the voiced velar fricative [ɣ] when it occurred intervocalically in conjunction with back vowels, as in dagas, 'days.' Doubled consonant letters indicated consonant length, as in pyffan [pyf:an] 'puff,' settan [set:an] 'set,' and spinnan [spin:an] 'spin.' Short fricatives were voiced intervocalically, as in heofon [heəvon] 'heaven,' and ægðer [æ:jðer] 'either.' Voiced fricatives, then, occurred in Old English only as phonetic variants of the voiceless fricatives.

In addition, sc represented [š], as in scip, 'ship,' and cg represented [ǰ], as in ecg, 'edge.'

The following is a table of the sound-spelling correspondences of Old English adapted from Venezky (1965: 195).

Table 1

Old English Consonant Spellings

Spelling	Posited Phonetic Value
b	[b]
p	[p]
d	[d]
t	[t]
k	[k]
c	[k], [c]
g	[g], [j]
cg	[ǰ]
s	[s], [z]
z	[ts], [dz]
þ, ð	[θ], [d]
f,ph	[f], [v]
x	[ks]
h	[h], [ç], [x]
m	[m]
n	[n]
l	[l]
r	[r]
sc	[š]
cw	[kw]

The vowel letters of Old English were those of the Latin alphabet--a, e, o, u--to which æ and y were added. The digraph oe represented [ø] which was formed from i-umlaut of [o] and was the early unrounded to [e] (Campbell, 1959: 76-77). y represented the high front rounded vowel [y]. In addition to the simple vowels there were four diphthongs in Old English, spelled ea, eo, io, and ie. The same spellings represented both long and short vowels and diphthongs.[3] Below is a table of the Old English vowels and their posited phonetic values:

Table 2

Old English Vowel and Diphthong Spellings

Vowels	
i	[i], [i:]
y	[y], [y:]
e	[e], [e:]
æ	[æ], [æ:]
a	[a], [a:]
o	[o], [o:]
u	[u], [u:]
Diphthongs	
ea	[æə], [æ:ə]
eo	[eo], [e:o]
io	[io], [i:o]
ie	[iə], [i:ə]

As suggested above, the same vowel and diphthong spellings represented long and short vowels and diphthongs; the vowels in biddan 'bid,' and bīdan 'bide,' as in Latin, were not distinguished in the original orthography.[4]

The sound changes which separate Old English from Middle English began in the late Old English period. The changes important for this study begin with the Old English lengthening and shortening of vowels and diphthongs before certain consonant clusters, and the later monophthongization of the Old English diphthongs. Important changes in early Middle English are vowel lengthening in open syllables and the loss of contrastive consonant length. Other significant changes are the rise of Middle English diphthongs and the reduction of unstressed vowels in inflectional endings. This reduction began earlier but was not reflected directly in the spelling until the Middle English period. The significance of these changes is that they make the spelling system and phonological system of Old English into those systems which existed when Norman French began its influence on English early in the Middle English period.

Old English short vowels and diphthongs were lengthened before a liquid or nasal plus a homorganic stop: [ld], cīld 'child'; [rd], hēard 'hard'; [mb], clīmban 'climb'; [nd], bīndan 'bind'; [ŋg], lāng 'long.' Short vowels and diphthongs were also lengthened before [r] plus [l], [n], or [d] : [rl], ēorl 'earl'; [rn], bēarn 'child'; [rd], ēorðe 'earth.' A third consonant following the lengthening

so that cīld 'child,' had a long vowel, while cildru 'children,' did not (Jordan, 1934: 39-40).

The Old English long and short diphthongs were leveled to long and short vowels in late Old English. ēa was leveled to [æ:] in strēam 'stream'; ēo was leveled to [ø:] in dēor 'dear';[5] īe and its short equivalent occurred only in West Saxon (Campbell, 1959: 68, 107, 126-128); their history is not significant for the development of Modern Standard English. The short diphthongs were leveled to equivalent short vowels: ea and eo became [æ] and [ø]. The io and eo spellings had become confused with each other early in the Old English period, most likely because the sounds they represented had been neutralized.

In the Old English period the reduction of unstressed vowels had also begun, especially in suffixes. Front vowels [i], [e], and [æ] all came to be written e fairly early in the Old English period. In late Old English a, o, and u came to be used interchangeably for unstressed back vowels. By the eleventh century the distinction between front and back unstressed vowels was being lost, so that hlēfdigen, mīnas could be written for hlǣfdigan, mīnes (Campbell: 153-157).

The long vowels showed changes between late Old English and early Middle English. The following table of correspondences is from Jordan (1934: 68-78).

Table 3

Long Vowels in lOE and eME

lOE	eME
[i:]	[i:]
[e:]	[e:]
[ø:]	[ø:], [e̝:]
[æ:]$_1$	[e̞:]
[æ:]$_2$	[ɛ:]
[a:]	[o̞:]
[o:]	[o̝:]
[u:]	[u:]
[y:]	[y:], [i:]

The high front and mid front rounded vowels [y(:)] and [ø(:)] remained in Middle English, especially in the southern dialects, for some time. [ø:] was eventually unrounded to [e̝:]. [y:] remained at least in some dialects throughout the Middle English period; it may in fact have survived into Modern English (Melchior, 1972; see also note 14 of this chapter).

These vowel changes altered the relationship between long and short vowels. In Old English, as mentioned above, there were long and short versions of each vowel. After the changes in early Middle English, this was no longer true. There were two long mid front vowels, [e̝:] and [e̞:], as

compared to one short vowel [e]; there were likewise two long mid back vowels compared to one short vowel [o]. Old English [æ] came to be written a in Middle English, but there is some doubt whether it was ever centralized, as the spelling suggests.

Two Middle English sound changes which left a permanent stamp on the spelling tactics of English were vowel lengthening in open syllables and the loss of contrastive consonant length in the thirteenth century. These changes left English with the pervasive--but not entirely consistent--spelling patterns of double consonant letters as signals of preceding short vowels, and of 'mute e' as a signal of a preceding long vowel.

Doubled consonant letters in Old English words like settan, middel, spillan, siþþan 'after,' or missan represented phonetically-long consonants. Single consonant letters in words like witan 'know,' and æþeling 'noble' represented phonetically-short consonants. Long consonants occurred only intervocalically and only after short vowels.[6] Although doubled consonant letters occurred in final position, they do not seem to have represented final long consonants.

In the thirteenth century short stressed vowels were lengthened in open syllables (before single short consonants followed by a vowel) in words like nama 'name.' Long consonants blocked open syllable lengthening, so that words like settan retained short vowels in Middle English.[7] When consonant length was lost, also in the thirteenth century,[8]

the spelling with doubled consonant letters was generally retained, leaving doubled consonant letters as a signal of a preceding short vowel.

Later in Middle English, vowels in inflectional endings were reduced to schwa, and the spelling of those vowels was changed to e, so that OE nama became ME nāme (pronounced [na:mə]). In late Middle English, when final schwa was dropped, final 'mute e' remained as a signal of a preceding long vowel.

Another effect of the loss of consonant length was the rise of voiced fricatives in English. In Old English contrastive voicing did not occur in the fricatives. Voiceless [f], [θ], and [s] occurred initially and finally; long fricatives were also voiceless. Intervocalic short fricatives were voiced in words like heofon 'heaven,' æþeling 'noble,' and bosm 'bosom.' Long fricatives were always voiceless. When contrastive length was lost in the medial consonants, short voiceless fricatives remained in words like missan and siþþan, and these consonants were in contrast to the short voiced fricatives in words like heofon (Kurath, 1956).

After the Norman Conquest the influence of French loan words and French scribal tradition had such a pervasive influence on English spelling that the orthography of English from late Middle English on can be considered a combination of French and native English spelling.

The orthographies of both French and English were, of course, based on Latin orthography. In addition, both languages were phonetically similar in many respects. The similarities and dissimilarities between the vowels and diphthongs are especially significant. The following vowel charts for Old French and early Middle English are based on those of Pope (1934: 433, 435).[9]

Table 4

Old French and Early Middle English Vowels

Old French Vowels

	i	y	u
	e̝		o̝
e		ø	
	e̞		o
	a		

Diphthongs: aj, ej, oj, uj, yj, we, aw, ow, ew
Triphthongs: ieu, eau

Early Middle English Vowels

Long			Short		
i	y:	u:	i	y	u
e̝:	ø:	o̝:	e	ø	o
e̞:		o:	æ		
æ:				a	
	a:				

Diphthongs: aj, ej, aw, ow, ew, iw

The differences between the consonant systems of Old French and Middle English were not in fact significant for the spelling. French had the alveolar affricates [ts] and [dz] (spelled with the letters c and z in cent and treze) which were lacking in Middle English. These sounds changed to [s] and [z], respectively, on the continent during the thirteenth century, somewhat earlier in Anglo-Norman (Pope, 1934: 93, 450). In addition, French had a palatal nasal [ñ] and lateral [λ] (in digne and vaillant); the nasal survives into Modern French, but the lateral changed to a palatal glide [j] during the Middle French period on the continent (Pope: 274). In Anglo-Norman [ñ] and [λ] changed to [n] and [l], respectively, preceded by a palatal glide in words like desdeign and soleil, apparently in conformity with the Middle English consonant system (Pope: 450).

Among the vowels, the greatest difference was in the length distinction of English, which did not occur in French. French, on the other hand, had many diphthongs and triphthongs which did not occur in English. The diphthongs of Middle English--[aj], [ej], [ow], [ew], and [iw] in day, eye, flowen, newe, and stiward--were falling diphthongs; that is, they had offglides rather than onglides like the rising diphthong in French oui. The diphthongs of Old French included all the diphthongs of Middle English except the [iw] of stiward.[10] In addition, French had the falling diphthongs [oj], [uj], and [yj] in joie, puint 'point,' and fruit. French also had rising diphthongs [ɥi] in cuiver 'quiver' and [je] in chef 'chief.'[11]

Anglo-Norman brought with it a number of triphthongs, and more arose in the course of its development in England (Pope: 445-446). Of the triphthongs, only two seem to have been borrowed into English--[ieu] and [eau], as in lieu and beauty or quarreau 'quarry.' These triphthongs may have actually been reduced to [ew] by the time they were borrowed (Pope: 446).[12]

Of course, English phonology differed from Anglo-Norman in other ways than the phonetic segments. Perhaps the most important difference was in the placement and strength of word stress. Middle English stress was much stronger than that of Old French. The result of this stress in Anglo-Norman was the acceleration of the reduction of unstressed syllables. Homophonous countertonic vowels, as in graanter, coalesced with the tonic vowel to yield granter (Pope: 437-439).

English stress was morphological, falling on the stem syllable of the word, whereas in French stress tended to fall on the penultimate syllable, regardless of the placement of the stem. In loan words, therefore, English tended to shift the stress forward to the stem syllable when it fell on some other syllable in French. Thus French pité and envíe tended to become English píte and énvie (Serjeantson, 1936: 295).

In those cases where the phonetic elements of French and English corresponded closely, as in the open and close mid vowels [e̤], [e̬], [o̤] and [o̬], little or no change had to be made for loan words from French to be absorbed into English; prēchen 'to preach,' for example, could be taken into English

with little phonetic change.[13] Most loan words, however, underwent some change when they were borrowed into English.

Serjeantson (1936: 295-300) provides a summary of the changes that took place before the during the transfer of loan words from Anglo-Norman into Middle English. Unless otherwise noted below, it is from her appendix on the phonology of French loan words that I have drawn my information on these changes.

The low and mid vowels of Anglo-Norman generally follow the same rules of lengthening as English (see note 13). They are long in open syllables under stress or before final consonants (dāme, debāt, apēlen, rōbe). They are short in closed syllables (part, lettre, cofre). Old French [a] was diphthongized to [aw] before nasals and was borrowed as [aw] into Middle English, as in chaunce; Anglo-Norman [aw] was monophthongized to [a:] in loan words before [mb] or [nd] (strange, chambre). [e] and [o] are long before final consonants (bēk 'beak,' clōs 'close'). Anglo-Norman [e] was very tense, sometimes appearing as [i:] in Middle English--Middle English has both frere and frire 'friar.'

[i] is long in open syllables when the stress remains on the same syllable, as in bīble. If the stress is shifted, the vowel remains short (pite 'pity,' diner 'dinner'; see note 13). When the stress remains the same, [u] may be short or long in closed syllables (scurge, scourge); it is usually long in open syllables (route), before a single final

consonant (bout) or before a nasal plus a consonant (count). When the accent is shifted, [u] is short (super 'supper'). However, [u] is sometimes short in open syllables when followed by a consonant plus l (duble 'double,' cuple 'couple').

[y], when the accent remained the same, was short in closed syllables (juggen 'judge'); it was long in open syllables and before a single final consonant (use and duc 'duke'). The history of this sound is obscure and hotly contested by scholars.[14] It seems to have been borrowed, or to have changed early in English, to [iw], which fell together with [ew], perhaps as early as 1300. The resulting sound develops normally into current English [ju:], as in few and duke, or loses the onglide, [u:] in chute (Dobson, 1968, II: 711-712).

The nasal vowels of French were denasalized in English. Since Anglo-Norman retained the Old French distinction between [ã] and [ẽ], these sounds were borrowed with distinct vowels and following nasals, as in emperor. [ã] followed by a nasal plus a consonant was diphthongized in Anglo-Norman to [ãw]. The spelling aun appears early in the thirteenth century in words like enchauntement (Pope, 1934: 442). The vowels in these words were denasalized when they were borrowed into English, but otherwise the words were unchanged. [aw] before [mb] and [nd] was monophthongized in Middle English to [a:] in words like chambre and strange, as mentioned above.

The other French diphthongs likewise had a complex history in Anglo-Norman and in their adoption into English. [aj] fell together with [ej] in the eleventh century, and [ej] was leveled to [ę] in the late twelfth and early thirteenth centuries. The nasal diphthongs followed the same course of development as the nonnasal ones, falling together first as [ẽj], then being leveled to [ę̃], so that ain, ein, and en represented the same sound in Anglo-Norman, and defens, mains, and meins were all rhymes (Pope: 444). Serjeantson (298) adds that [aj] and [ej] remained as diphthongs longest before [l], [m], and [n], and when final. The offglide remained before vowels, so that English borrowed grain, paien, obeien, but pēs 'peace' and recēt 'receipt,' which originally had [aj] and [ej], respectively. A new [aj] had also developed before the conquest from French [a] before [lj] or [nj], the glide fronting and consonant and then disappearing, leaving words like tailor and Spaine. The continental development of [ej] to [oj] was responsible for later loans like esploit and royal.

The diphthong [o̧j] was borrowed directly into Middle English (noise, ioie). Anglo-Norman [uj], from Old French [o̧j], comes into Middle English sometimes as ui, sometimes as oi. The oi spelling, as Serjeantson points out (298), may represent the [uj] diphthong, since o was often used in Middle English to represent short [u] (compare sun-son). Variants of puint 'point,' and builen 'boil' may be spelling variants, or they may be from continental French, where [o̧j]

fell together with [oj], so that the normal spelling would be point, boilen.

The spelling ui could also represent two other diphthongs in French. It could represent the falling diphthong [yj], which occurred in fruit; this diphthong ordinarily was leveled to [y], and followed the course of development of that vowel. After [k] it became a rising diphthong [ɥi] and, in English as well as continental French, developed into [wi], as in quiver and squirrel (from Old French cuiver, escuireuil).

Three reflexes occurred in Anglo-Norman for Old French [ue]. It could remain a falling diphthong and be leveled to [u] as in buf (OF buef) 'beef'; it could change to a rising diphthong [we]; or it could change to [ø] (Pope: 443-444). The last reflex was the one borrowed into Middle English, falling together with Middle English [ø] (Serjeantson: 299). It was spelled ue, eo, oe, and e, in words like people and boef 'beef.'

The rising diphthong [je] was leveled to [e] in Anglo-Norman during the latter part of the twelfth century. It was borrowed into English as [e] in words like chēf 'chief,' and pēce 'piece' (see note 11).

Additional diphthongs were formed from the vowels [a], [e], and [o] when they preceded Old French [ʎ]. [ʎ] changed into an offglide, forming the diphthongs [aw], [ew], and [ow] (Pope: 446). These diphthongs were borrowed into Middle English in faut, souden, peutre, but before labial

consonants they were monophthongized to long vowels, as in sāf 'safe.'[15]

One triphthong [eau] comes from the same course as the diphthong [ew] above, that is, from [e] plus Old French [λ]. In Middle English loan words it fell together with [ew] and followed the same course of development in beauty (also spelled beuty).

A number of consonants differed in Anglo-Norman and the Central French dialect attaining dominance on the continent. English borrowed heavily from both dialects, occasionally even borrowing the same word twice, once from each dialect. This situation is reflected in the pair warranty (Anglo-Norman) and guarantee (Central French).

Anglo-Norman initial [w] corresponded to Central French [g] in Germanic loan words (from Germanic [w]), giving Middle English werre 'war,' waste, warisoun, as well as gile 'guile,' gerdoun 'guerdon,' and garisoun. Anglo-Norman [k] before [a] corresponded to Central French [č], as in casten 'chasten,' cacchen, catel, compared to chasten, chacen, chatel. Anglo-Norman [g] corresponded to Central French [ts], which was being simplified to [s]. Examples from Anglo-Norman are chisel, cacchen 'catch,' and winch, as opposed to Central French chace, cite 'city,' and wince. Finally, Anglo-Norman [š] corresponded to Central French [s], as in norishe, anguishe, compared to rejoice.

The consonants [θ] and [ð] remained longer in Anglo-Norman than in continental French, perhaps, as Pope suggests (431-432), because of the presence of these sounds in English. [θ] and [ð] developed from [t] and [d], respectively, which became continuants intervocalically and finally after a vowel. [θ] occurs in a few early loan words like caritep 'charity' (later caritē), and plentep (later plentē). [ð] also developed from [z] before a voiced consonant and from [s] before [f], as in meðler and eðfreuer; this fricative was hardened into [d] in Middle English medle (from meðler) and medlar (from meðlier) (Pope: 448-449).

Initial [h] does not occur in early loans from French, except where influenced by classical Latin spelling, as in hour. But in loan words originally from Germanic, like haste, heraud, and hardy, initial [h] was retained and borrowed into English.

Finally, Old French final [n] became [m] be dissimilation after front consonants [l], [r], [n], [s], giving venim, ransum, and pelegrim (from French venin, ransum, pilegrin).

The leveling of diphthongs in Anglo-Norman led to a great deal of confusion in the spelling of Anglo-Norman itself and in the spelling of loan words in English. Anglo-Norman [aj] and [ej] were both leveled to [ę], for which English ea (from Old English ēa, whose Middle English reflex was [ę:]--Jordan, 1934: 97) and Latin ae could also be used. In the end, five spellings were possible for [fęt]--fait,

feit, fet, feat, and faet. To aggravate this situation, after the thirteenth century continental French [oj] was changing by way of [we] to [ę], adding oi and oe to the number of possible spellings for [ę]. In addition, ee came to be used to represent final [ę], to distinguish it from [ə], in words like donnee and anee, and this doubling was used from the mid-thirteenth century on to represent [ę] in stressed syllables, as in pees (for pais). Pre-consonantal s, which had been dropped in pronunciation, also came to represent 'lengthened [ę],' as in fest for [fęt] (Pope: 460). Finally, then, [vęt] (from videt and vadit) could be spelled uet, uait, uoit, uoet, uest, or ueet, as well as ueat or uaet (Pope: 458).

In the transfer of loan words from French to English it was the French words which accommodated themselves to the phonology of English. The palatal consonants of French, [λ] and [ñ], for instance, were changed in English to the similar alveolar [l] and [n], as in valliant and sign. Frequently there were nearly exact phonetic equivalents between French and English sounds, like the parallel between the French vowels and the Middle English long vowels (Table 4 above). The transfer of loan words from French to English was accomplished by a process of phonological translation, which replaced a phonetic segment in a French word (like French [ñ] in signe) with the English segment most phonetically similar ([n] in English sign).[16] Since the loan words brought with them new spellings, which they retained after

their anglicization, they added new spellings for English sounds, such as ai for [ę:], as in pais 'peace.'[17]

In addition to new spellings brought into English with loan words, Anglo-Norman scribes wrought a number of other changes in spelling which were not related to the phonology of loan words. A peculiarity of Old French orthography was an uncertainty whether to represent Old French [o̤] with u or o,[18] an uncertainty which affected the Middle English spelling of short [u] (in sun and son, for instance) but not long [u:]. The spelling of French [o̤], vacillating between o and u, as in tor and tur (Modern tour), was resolved in the thirteenth century on the continent (Beaulieux, 1927: 175), somewhat later in Anglo-Norman, as ou. The ou spelling originated from the leveling of the [ow] diphthongs in mout and escoute to [u] (Pope: 278). The ou spelling was generally adopted for English [u:], as in house and out.

When [u] was regularly spelled ou, the letter u was more or less exclusively to represent [y], as it does in Modern French. This spelling was borrowed along with the [y] sound in words like use and duc. French [y] then fell together with Middle English [iw], which developed ultimately into Modern English [ju:] in use and duke (see above and note 14), giving u as an alternative spelling to Middle English eu, ew, and iw, as in few and stiward.

The change of [ts] to [s] in Anglo-Norman was responsible for the use of c with the value [s]. In early Old French [ts] could be represented by either ti or ci, but c (before i or e) later became the usual representation.

The French use of h to suggest modification of the pronunciation of a letter was partly responsible for the number of digraphs consisting of a letter plus h in English. h was attached to a letter to indicate that its pronunciation was 'not what would normally be expected under the conditions in which it stood' (Pope: 177); for instance, ch (which occasionally represented [k], as in Latin Christus) generally represented [t͡ʃ], as in Charles or cheval. Old English used th in the earliest manuscripts to represent [θ] and [ð̄],[19] and h was used to represent the velar fricative [x], so that there was some precedent in Old English for the use of h in wh for [w], gh for [x], and s(c)h for [ʃ].[20] The wh spelling for [ʍ] is, of course, simply reversed from the Old English spelling hw, as in hwæt 'what.'

I cannot give more than a general outline of Middle English spelling, since, although the subject has been frequently discussed, it has never received more than cursory treatment.[21] I do not have access to the materials for a thorough study, so I must rely largely on secondary sources. The following sketch of Middle English spelling comes partly from my own investigation, but it also depends heavily on Mosse's (1952) discussion of Middle English spelling, on Robinson's (1961) summary of spelling and pronunciation in Chaucer, and especially on Venezky's chapter on the development of English orthography (1965: 191-214). Although Venezky's chapter misses some important generalizations in the development of English spelling, it is excellent in its

treatment of specific Anglo-Norman scribal changes and the later changes brought about by the etymologizing of the Renaissance.

French influence was pervasive in the spelling of Middle English vowels, although native developments, like doubling of long vowels, also left their stamp on the spelling. After the French ou spelling for [u:] was introduced (although u was still used to represent short [u]--see below), y then became an alternate spelling for [i(:)] in words like bydden 'bid,' or byden 'bide.' y was also used to represent the palatal glide [j] in words like yelpe 'yelp.'

u and o were interchangeable spellings for either [u] or [o], partly because of the French habit of not distinguishing the spellings, and partly because of the handwriting of the scribes. o was frequently substituted for u, especially in the vicinity of u, m, and n, to avoid a succession of minims, or downstrokes, which made the letters of words like some and son difficult to distinguish when spelled with u (Venezky, 1965: 202).

Old English æ disappeared early and was replaced by ea, a, or e in words like appel.

Later introductions from French were ei and ie, representing [ę:] and [ę:], respectively, in receive and chief. ei did not become common until the fourteenth century, and ie not until the fifteenth century.

The reduced vowel [ə] in inflectional endings was represented by e, as in biden 'bide.' When final schwa disappeared in late Middle English the 'mute e' spelling remained as a signal of a preceding long vowel.

A development in spelling native to English was the doubling of vowel letters to represent long vowels, especially the mid vowels. ee and oo were used frequently to represent both the open and closed mid vowels. In sweete and heeth 'heath,' ee represents [e̤:] and [e̝:], respectively. In good and goot 'goat,' oo represents [o̤:] and [o̝:]. The ea and oa spellings which represent [e̝:] and [o̝:], respectively, occurred in the Middle English period (ea was, of course, an Old English spelling) but were not put into general use until the fifteenth and sixteenth centuries.

The diphthongs of Middle English arise from a number of sources. [oj] and [uj] seem to have come into English from French in words like joie and puint 'point.' It is difficult to tell to what extent the oi (oy) and ui (uy) spellings represented different sounds, however, because of the general confusion between u and o spellings.

Early Middle English [aj] and [ej] merged early, yielding [aj]. The general spelling was ai (ay), so that the spelling of sail (OE segl) and way (OE weg) reflected the same vowel as day (OE dæg). A few words like they and eight preserve the e spelling.

The [ow], [ew], [aw], and [iw] diphthongs were spelled more or less phonetically in growen, knew, cause, and stiward. [iw] also developed from Anglo-Norman [y:], so that u was a possible spelling, as in vertu. The offglide of [ow] was frequently not represented in the spelling when it occurred before [x], as in fo(u)ghte or tho(u)ght.

The following chart, adapted from Robinson (1961: xxxi), summarizes the spelling of the vowels and diphthongs of fourteenth-century English.

Table 5

Middle English Vowel Spellings

Sound	Spelling - Short Vowels	Examples
[i]	i, y	this, thyng
[e]	e	tendre
[ə]	e	yonge, sonne
[a]	a	can, that
[o]	o	oft, lot
[u]	u, o	but, yonge
Sound	**Spelling - Long Vowels**	**Examples**
[i:]	i, y	shires, ryden
[e̝:]	e, ee (eo)	sweete
[e̞:]	e, ee (ea, ei, ai)	heeth
[a:]	a, aa	name, caas
[o̞:]	o, oo	holy, rood (vb.)
[o̝:]	o, oo	good, bote
[u:]	ou, ow, ogh	fowles, droghte
Sound	**Diphthongs**	**Examples**
[iw]	u, iu, iw	vertu, stiward
[ew]	eu, ew	knew, lewed
[aw]	au, aw	cause, draughte
[ow]	ou, ow	growen, sowle
[aj]	ai, ay, ei, ey	sayle, day, they
[oj]	oi, oy	coy, joie

The above table assumes that Old English [y(:)] had disappeared in late Middle English. Ordinarily OE [y:] became ME [i:], as in fir 'fire,' or pride. OE [y] became [i] as in synne 'sin.' This merger also contributed to the interchangeable use of i and y in Middle English. Anglo-Norman and Old French [y], on the other hand, was generally borrowed as [u], and OF [y:] generally came into English as [iw]--responsible for the u spelling in the chart. However, [y(:)] did not drop out of all varieties of English until much later; there is some evidence that it survived at least into the late seventeenth century (see note 14).

A number of changes in the spelling of the consonants of Middle English were made by French scribes. These changes did not reflect changes in the phonology of the language, but only in its appearance. My source, unless otherwise noted, is Venezky (1965: 201-204).

The remaining letters of the runic alphabet, wynn (ƿ), thorn (þ), and eth (ð), all disappeared. Wynn was replaced by w. Eth was replaced by thorn and th, and thorn continued in use until the introduction of printing. Since the early type was made in France, there was no letter to represent English [θ] or [ð], and th eventually came to be used exclusively for both sounds.

Yogh (ȝ) represented a number of related but different sounds in Middle English. It was replaced by g when it represented [g], as in gras 'grass.' It was replaced by

gh when it represented [x], and by y when it represented [j], as in knight and yelp, respectively. g was also used to represent [ǰ], as in hegge [heǰə] 'hedge,' and initial [ǰ] in French loans like gentile 'gentle.' Initial [ǰ] was also represented by i (or j, which was a positional variant of i--OED) in words like ioie 'joy.'

In keeping with the French habit of using h to indicate the changed value of a letter (above), [č] came to be represented by ch, as in cherle 'churl,' as well as in French words like the name Charles. [š] (OE sc, as in scip 'ship') was variously spelled sch, ssh, or sh, as in schal 'shall,' flessh 'flesh,' or fish, eventually settling down to the modern sh spelling. The order of the Old English hw sequence was reversed everywhere to wh, as in what (OE hwæt).

c in its double value as [k] and [s] was introduced through French in words like certayne 'certain.' Since c was used to represent [s] before e and i, k was used to represent [k] in those positions, as well as before n and l, as in kepe, knaue, and kloke 'cloak' (Mosse,1952: 9).

In late Middle English, ph began to be substituted for f in learned words of Greek origin, like phleume 'phlegm,' where it was a transliteration of Greek phi.

The doubled consonant letters left from Old English long consonants took on their role in Middle English as signals of preceding short stressed vowels in words like beggar, cribbe 'crib,' dokke 'dock' (vb.), and bicche 'bitch.'

The doubling of consonants was not consistently carried out in the spelling, however, so that there are doublets like cache-cacche 'catch,' and comen-commen 'come.'

The fifteenth century marked the transition from Middle to Modern English. Sound changes like the Great Vowel Shift were in progress in the fifteenth century, along with consonant loss and cluster simplification which left a residue in the spelling of English. The stress system of English was also changing at this time. In addition to the sound changes of the fifteenth century, there were other changes which affected the development of English spelling, directly or indirectly.

Although Middle English spelling had been subject to considerable variation, that variation was consistent in that a certain small number of spellings were used for each sound (such as e, ee, and rarely ea, ei, ai for [ę:]). Variations in fifteenth-century spelling became inconsistent, or less consistent, than that of Middle English, for a number of reasons.

In early fifteenth-century sources like the London Chronicles, the spelling is very much like that of Chaucer, but later in the century, in sources like the records of Parliament and the Paston Letters,[22] more variants began to occur, which finally formed a spelling system very near that of Modern English. One reason for the instability in fifteenth-century spelling was an increase in literacy, which, by adding a large number of people who could read and

write, caused a breakdown in the scribal tradition (Wyld, 1936: 63).

Another cause of the instability was undoubtedly the influence of regional dialects. However, the scarcity of material on Middle English dialects makes it difficult to assess the influence of the dialects on the spelling.[23] We know that the population of London was constantly being recruited from all over England (Chambers and Daunt, 1931: 237), and that people of high rank (like Margaret Paston of the Paston Letters, who is mentioned above) usually employed secretaries to whom they dictated their correspondence (Kihlbom, 1926: xiii).

The greatest variation in the spelling occurred in the representation of post-tonic unstressed syllables, where the reduction of the vowels made all the vowel spellings meaningless. The vowel letters in the final syllables of taken, lynyn 'linen,' and happon 'happen,' all represented a pronunciation which was probably virtually identical with the pronunciation of those syllables today.

In the inflectional endings-- -ed (past participle), -eth (third person singular), -es (second person singular and noun plural)--the most frequent variation was -id, -ith, and -is (or the equivalent -yd, -yth, -ys), as in dwellyd, semyth 'seemeth,' or horsis. More rarely u occurred, as in clepud 'clept.' In -en and -en plus a consonant, o and u occur, as well as i (y), in y-writon 'written,' gotun 'gotten,' and gravyn 'graven.'

There was a tendency to represent all unstressed vowels with i or y, on the one hand, or a, o, or u, on the other. It may be that the i spellings represent [i] pronunciations, while the a, o, and u spellings represent [ə], as in the two modern pronunciations of stomach [stʌmək] and [stʌmik] (Wyld, 1936: 258-282).

Some of the variations are due to varying stress on the words concerned--certin from ME certein, certayne from ME certein (Wyld: 259).

Another occasional variation which apparently represented a variant pronunciation was e where [i] was expected. This alternation in words like wreten 'written,' and drevyn 'driven,' seems to be involved with the lengthening of [i] to [e:] in Middle English.[24]

While confusion over the spelling of unstressed vowels was making itself evident, the spelling of vowels in stressed syllables was changing to the consistent system of the sixteenth century. Early fifteenth-century sources like the London Chronicles, where the scribal traditions were preserved (Kjerrstrom, 1946: 15), generally reflect Middle English spelling traditions. Letters are occasionally doubled to represent long vowels, especially mid vowels, as in queen or goode. Final e is sometimes used to indicate vowel length, as in coke 'cook,' or kepe 'keep.' ou (ow) was used almost exclusively for [u:] (in howse or toun) except in words which had French [õ] and [ũ], where o

frequently occurred, as in consellyd 'counselled,' or montaynys 'mountains.' Consonant spellings display a few variants like f for [v] in fochesave 'vouchsafe,' and p for [b] in pupplyscyde 'published' (also v for [f] and the Old English spelling sc for [s]). Of some significance is the occasional use of sch to represent [sk], as in schole 'school' (a transliteration of Greek ox), as it does in today's English.

In general, though, early fifteenth-century sources did not distinguish open and close mid vowels in the spelling any more than Middle English did. Length in both instances may be indicated by doubling or final mute e. The ea spelling for [ɛ̨:] (as in great) occurs rarely in the London Chronicles examined by Kjerrstrom (1946: 250), the oa spelling for [ɔ̨:] not at all.

The distinction in spelling of the long open and close mid vowels is one of the spelling features that marks the difference between Middle and Modern English. The Old English ea spelling was revived to represent [ɛ̨:], especially in native words like great (OE grēat) and deal (OE dæl). The oa spelling for [ɔ̨:] was introduced late and applied less consistently in words like boat and oath. Lekebusch (1906: 36), using official records that cover the latter two-thirds of the fifteenth century, says that the ea spelling becomes more and more frequent during the last twenty-seven years of the century. But he records no occurrence of the oa spelling.

In the Paston Letters, however, both ea and oa occur, though not with total consistency. Neumann (1904) records one instance of the use of ea to represent [e:]--meave 'move.' Otherwise, ea occurs in familiar spellings like please and meane, as well as the unfamiliar sease 'seize' (32). oa occurs in oath and broad, as well as in stoan 'stone' (57).

We can see that by the early Modern period, English had acquired a bewildering variety of alternate spellings, especially the vowel spellings that were a legacy of French loan words and pronunciations. The ie spelling of chief, the eo of people, as well as the eau of beauty were relics of distinct French pronunciations which had long since been lost in English.

If we take the Middle English vowels and their spellings listed in Table 5 above and consider the changes in English pronunciation in the early Modern English period, we can see what opportunity for confusion existed in these spellings.

In the first place, the Great Vowel Shift changed the relationships between long and short vowels. Once ME [i:] had become a diphthong, it was no longer phonetically the long (or tense) version of [i], and the similar spellings of bit and bite were phonetically misleading. [u:], as we have seen, was spelled with a digraph ou (ow), so its spelling was not similarly misleading. The spellings of long mid vowels were never entirely consistent, but the final coalescence of the Middle English front mid vowels

left a single vowel [i:] with seven historical spellings (e, ee, eo, ea, ei, ie, and ai), none of which was directly related phonetically to the sound it represented. The diphthongs [iw] and [ew] were in process of changing from falling diphthongs to rising [ju:]. The [aw] and [aj] diphthongs were becoming monophthongized into [ɔ] and [e:].

In addition, certain consonant sounds like [x] and initial [k] and [g] before nasals were disappearing, in some instances with compensatory lengthening, as in knight. French influences had added c with the value of [s], and qu with the value of [k] or [kw].

The vowel system of English in particular was in flux in the fifteenth and sixteenth centuries. Two other factors entered the picture at this point--a new influx of loan words from Latin with Latin spellings intact, along with etymological respellings of older Latin loan words, and a gradual freezing of the spelling system, largely because of the influence of printing.

The fifteenth through the seventeenth centuries saw a great influx of words like accommodate (the OED records the first appearance in 1525) and exaggerate (1553), whose double consonants were not motivated in the English spelling system, where double consonants indicated short vowels in preceding stressed syllables. At any rate, the normal 'double' form for [ǰ] was dg, as in edge, not gg. Other examples are occasion (1382), occur (1527), succession (1537), and recommend (spelled recomend by Chaucer in 1386).

In addition to unmotivated double consonants, Latin spellings and respellings brought problems with vowel spellings. Since all unstressed vowels are subject to vowel reduction in English, unstressed vowels are also subject to spelling variation. The polysyllabic words borrowed from Latin offer more opportunity for variant spellings of 'schwa' than most of the shorter native English words. So Renaissance borrowings give us problem words like definite (1553) and separate (adj., 1526), as well as the -ent endings in words like existent (1561) and prevalent (1576).

The changes occurring in the pronunciation of early Modern English combined with large numbers of borrowed words coming into the language and an already staggering number of spellings for the vowels and diphthongs to create a situation in which the sound-spelling relationships in English must have bordered on the chaotic, as some of the whimsical spellings from fifteenth-century documents suggest. In the midst of this situation, and perhaps partly because of the need for stability it created, spelling began to be frozen. The introduction of printing and the spread of literacy from the fifteenth century on, combined with the undoubtedly tremendous influence of the 1611 King James translation of the Bible, encouraged and helped printers in choosing one from among the alternative spellings for each word or morpheme and sticking to that choice. By the middle of the seventeenth century, English spelling had assumed the form it was to keep (Baugh, 1957: 256-257). Students of English

literature cannot help but notice that at times it seems that Chaucer never spells the same word the same way twice; Shakespeare still exhibits some variant spellings and spellings that strike us as unusual; but Milton's spelling is virtually identical with our own.

From a historical point of view, what English spelling preserves is a hodgepodge of relics from defunct pronunciations and linguistic sources. Words like knight preserve in spelling consonants which have not been pronounced for centuries; the spellings of heath and beet reflect a distinction (ME long open [ɛ:] and long close [e:]) that died out after the seventeenth century. The spelling of accommodate and prevalent reflects classical Latin, rather than English, pronunciation.

Insofar as it reflects English pronunciation at all, English spelling reflects Middle English pronunciation. This in itself does not make the spelling remarkably inconsistent, phonetically or phonologically. The changes of the Great Vowel Shift were regular changes, and left regular, although changed, correspondences between the vowels and their spellings. It is somewhat awkward from the point of view of terminology that 'long i' is a diphthong [aj] and 'long e' is [ij], while 'short i' is phonetically closer to 'long e' than to 'long i' and 'short e' is phonetically kin to 'long a' [ej]. If, as Chomsky and Halle (1968) maintain, the phonological representation is very conservative and the spelling reflects a level of phonology near

the phonological representation, then the relationship between the spelling and pronunciation of English stressed vowels is normal and regular. But other influences than regular phonetic change have been at work on the spelling of English, so that the underlying regularity of the system, as it is, is often very difficult to see.

Notes

[1]To represent the vowels of Middle and early Modern English, I shall use the traditional symbols of the philologists, which were developed for this purpose. I shall use a colon to indicate length in the vowels and, when needed, in the consonants. The short vowels of Middle English will be represented by simple letter symbols--[i], [e], [a], [o], [u]. The long high vowels will be represented by letter symbols plus colons--[i:], [u:]; also the low vowel [a:]. The mid close and open vowels are represented with dots and hooks, respectively--[ẹ:], [ọ:], [ẹ:], [ọ:]. In the relatively few cases where I cite Old English forms, I shall use traditional orthography with macrons to indicate long vowels and long diphthongs.

[2]Palatal c and g (as opposed to the velar stops from which they evolved) are distinct sounds in Old English, and cannot always be predicted on the basis of the surface phonology. Some knowledge of the previous history of the language is required (Campbell, 1959: 21-22).

[3]Although vowel length was not marked in Old English manuscripts, I shall mark long vowels and diphthongs with macrons in the examples I cite, following editorial tradition in works on Old English, for the sake of clarity--ceorl 'churl,' ceosan 'choose.'

[4]This summary of the Old English vowels and diphthongs is, of course, greatly simplified and is given only to illustrate the development of English spelling. It also ignores the recent controversies about the phonemic and phonetic nature of Old English vowels and diphthongs. For a summary and evaluation of dissenting opinions, see Kuhn and Quirk (1953), who ultimately defend the traditional philological view. I have followed Kuhn and Quirk because, in this article and those mentioned below, their arguments seem more persuasive, and their treatment of the data more convincing. For a full treatment of Stockwell's monophthongal theory, see Stockwell (1958), in which short ea, eo, and io (West Saxon ie) are assigned with phonetic values [a], [ə], [ɨ], which are central allophonic variants of /æ/, /e/, and /i/, respectively. A rebuttal of Kuhn and Quirk (1953) was published by Stockwell and Barritt (1955), in which many of the original claims made by Stockwell and Barritt (1951) were withdrawn. In the same issue of Language was published a counter-rebuttal by Kuhn and Quirk (1955). Fisiak

(1968: 32-33, 35) follows the interpretation of Stockwell and Barritt (1951) and Stockwell (1953).

[5] īo and ēo were not distinct in West Saxon, the literary dialect (Campbell, 1959: 125-126).

[6] Peters (1967) has called the phonological significance of Old English long consonants into question. He bases his objections on the principle of complementary distribution. Few if any convincing minimal pairs can be found for consonant length in Old English. However, Peters reaches no firm conclusions as to the status of consonant length. I have followed what seems to me the more satisfactory analysis of Kurath (1956).

[7] There is some difficulty with terminology here. Kurath (1956), writing from the American structuralist framework, uses the term 'phonemically long' consonants. In the generative framework, which, except for Schane (1971, 1973), does not recognize phonemic contrast, the change from long to short consonants would involve restructuring--change in the underlying representation--as would the rise of voiced fricatives concurrent with the loss of consonant length.

[8] Contrastive consonant length was lost in some of the northern dialects, like that of Orm, by 1200. In more conservative southern dialects, long consonants remained throughout the fourteenth century (Kurath, 1956: 443-445).

[9] In terms of phonology, the distinction between (continental) Old French and the Anglo-Norman dialect is not made consistently. Generally, the same sound changes seem to have occurred in Anglo-Norman as in Old French.

[10] Since ME [ew] coalesced with ME [iw] in the fifteenth century (Fisiak, 1968: 55), words borrowed from French with [ew] also changed to [iw] (as in peutre 'pewter'), which develops normally into the Modern English rising diphthong [ju:] in pewter or few.

[11] OF [je] was monophthongized early in Anglo-Norman to [ę]. It was apparently borrowed as [ę:]in Middle English and spelled with e in words like chef. The ie spelling in words like chief, relief, fierce was rare before the fifteenth century (Serjeantson, 1935: 298).

[12] Professor William J. Sullivan has suggested an example which must have contained both triphthongs--Beaulieu Abbey (pronounced [bjulij]. This word also illustrates the development of these sounds in stressed ([ju]) and unstressed ([ij]) position.

[13]Anglo-Norman, unlike English, did not have distinct long and short vowels. In English, of course, the distinction between open and close mid vowels occurred only in the long vowels, not in the short vowels. Vowel lengthening in loan words in English followed the same rules that applied to native English words. For instance, vowels were lengthened in open syllables under stress--native name, French robe. French words with [i] and [u] followed this rule as long as the stress was not shifted (bible, house); if the stress was shifted, [i] and [u] were short, as in city.

[14]The course of development of ME [ew], [iw], and [y:] (from OE y) has been hotly debated by philologists. Dobson (1968, II: 699-713) summarized the arguments and presents the evidence, along with his own theory of the development of the sounds up to 1700. Kokeritz (1959) suggests a different theory for the development of [y:] into [(j)u:]. Melchior (1972) argues from the evidence of Thomas Smith and John Wallis that [y:] must have survived into the later seventeenth century.

[15]Later spellings of these words with l, as in fault, or falcon, is due to the reborrowing of a Latinized form from later French, or to the Latinized respelling of words in English, which will be discussed later in this chapter.

[16]Catford (1965: 56-61) discusses phonological translation as transfer at the phonemic level. In generative theory the transfer would take place at the systematic phonetic level, with phonetic similarity defined in terms of phonetic features. The borrowed word would become attached to an Anglicized systematic phonemic representation subject to English rules, such as vowel lengthening in open syllables.

[17]There was also considerable influence of English on Anglo-Norman spelling. The reflex of early Old French ie in siet (from Latin sapit) was [ẹ], which was associated with Middle English [ẹ:], reflex of Old English eo; the result was that eo was added to the possible spellings of [ẹ] in Anglo-Norman, so that set, siet, and seot were interchangeable spellings for [sẹt].

[18]This confusion stems from the fact that Old French [o] developed from Latin [o:] and [u], just as OF [ẹ] developed from Latin [e:] and [i]. The Latin spellings tended to be preserved with u and o after the distinction in pronunciation disappeared.

[19]English had three representations for [θ] and [ð]. th was used from the earliest times in Old English, but thorn (þ), of runic origin, and eth (ð) were introduced during the Old English period. eth disappeared during Middle English, but thorn continued in use until the introduction of printing (OED).

[20]The Old English spelling was sc, as in scip 'ship.' Other spellings for [š] used by French-educated scribes were s, ss, sz. By the fourteenth century sch was generally used initially (as in schal 'shall'), with other variants (sh and ssh) used medially (OED).

[21]Middle English spelling has, of course, been approached from the point of view of graphemic theory by McIntosh and Samuels. But apart from McIntosh's initial paper (1956), and articles announcing early results by McIntosh (1963) and Samuels (1963), no general application has been made of graphemics to Middle English spelling and dialectology.

[22]I have had to rely on secondary sources for most of my data on fifteenth-century English. When fifteenth-century documents are available at all, they frequently have been edited as historical, rather than linguistic, documents; variant spellings are often regularized, therefore, and other information of linguistic interest is sometimes omitted. In the latest edition of the Paston Letters by Norman Davis (1971), pains have been taken to produce a reliable text, and to provide other valuable information, such as whether a letter is autograph, or was taken down by a secretary. Unfortunately, this edition is not yet complete. Three sources I have found especially helpful are Kjerrstrom (1946), The language of the London chronicles; Neumann (1904), Die Orthographie der Paston Letters von 1422-1461; and Lekebusch (1906), Die londoner Urkundensprache von 1430-1500. I believe that the thoroughness of these works makes them reliable sources for the spelling of the fifteenth century, even when their interpretation of the phonology has been superseded.

[23]The existing studies of Middle English dialects are not very helpful in this respect. The data in the last complete dialect study (Moore, Meech, and Whitehall, 1935) are so limited that they have little value in discovering spelling patterns associated with different dialects. The work begun by McIntosh (1963) and Samuels (1963) is more promising, but still incomplete.

[24]Trnka (1959) points to the peculiar alignment of long and short vowels in Middle English as an early stage of the Great Vowel Shift. [u:] and [i:] had no equivalent short vowels. [i] and [u] were lengthened to [e:] and [o:], respectively. [e] and[o] had [e:] and [o:] as their long counterparts. Examples illustrating the lengthening of [i] and [u] are [we:kəs] 'weeks,' from [wikəs], and [wo:də] 'wood,' from [wudə](Trnka: 441).

CHAPTER II

ALPHABETIC WRITING AND PHONOLOGICAL THEORY

Alphabetic writing is the representation of the phonetic or phonological segments of a language by discrete graphic symbols. The relationship between the symbols and the segments that they represent is necessarily arbitrary in the sense that alphabets consist of 'pieces,' of discrete images, which are put together to represent units of language, while phonetic and phonological segments are not discrete pieces but are made up of features. The assignment of a particular graphic shape to a particular segment is motivated by tradition and is not apparently related to the structure of the language. The spelling of some homophones in English, as in 'crewell gnus' for 'cruel news,' indicates the potential independence of spelling from phonology in indicating meaning; the visual form of the words can indicate their meaning independent of sound. Although arbitrary, alphabetic writing is related more or less directly to the phonetic or phonological segments of a language.

Alphabets represent these segments at some level of abstraction. They do not represent sound either at the articulatory or the acoustical level since segments are theoretical constructs, not detectable at the level of

production or perception of speech (see Ladefoged, 1967 and Halle, 1964).

The traditional motivation for the assignment of particular graphic shapes to the spelling of English words has been treated in Chapter I. This chapter is concerned with the relationship between phonological theory and English spelling. In this chapter and Chapter III, I shall lay the theoretical basis for the discussion of Robinson's alphabet in Chapter V. And, finally, I hope to achieve a limited synthesis of the two dominant American theories of phonology, generative and stratificational phonology, to the extent that they can be related to alphabetic writing.

My discussion will begin with the ancestors of the current theories, the American structuralist and Prague school theories, both of which have exerted a powerful influence on the contemporary schools.

Alphabetic writing is generally (and often tacitly) taken to be the optimum representation of a language. It is associated with the phonology of the language, rather than with the morphology, in contrast to the Chinese character system, which is essentially morphemic.[1] It is also associated with the phonological segments, in contrast to the syllabic writing system of Japanese[2] and the consonantal system of Arabic and Hebrew. Alphabets represent each segment of the phonology, consonant and vowel, with a letter or combination of letters. English spelling is morphemic to the extent that it uses alternate spellings to indicate

the difference between homophones (as in they're, there, their, or crewell gnus, mentioned above). It nevertheless seems to operate on the basic principle of one letter for each segment.

The difficulties of dealing with alphabetic writing come in relating a given alphabetic system to a particular theoretical interpretation of the phonological segments of the language in question. Although some languages, notably Spanish and Italian, seem to present no problems to the speaker in relating the sound to the spelling, others are notorious for their inconsistency in relating sound to spelling (writing) and spelling to sound (pronunciation). French[3] is especially noted for its variant spellings of the same sound, while English has both variant spellings of the same sound and variant pronunciations of the same spelling.[4]

If the spelling of a language corresponds to the phonological segments of that language, however inconsistently, the degree of correspondence between the segments and their representation can be determined only if there is a clear picture of what those segments are, independent of the spelling. Since theories of phonology vary on this subject, some preliminary discussion of them and their approaches may be helpful.

Until the development of generative phonology, linguists generally maintained that the alphabetic principle was the correspondence of one spelling unit or letter to

each phoneme of the language being spelled.[5] Gelb (1963: 197) suggests that the word 'alphabet' refers to 'writing which expresses the single sounds of a language.' Although Gelb does not use the term 'phoneme,' his notion of 'single sounds' suggests phonemics. Bloomfield (1933: 290) states unequivocally that 'the principle of phonemic or alphabetic writing,' arrived at by the Greeks, was 'the principle of using a single symbol for each phoneme,' and that the match between symbols and phonemes was imperfect only because the Greeks did not have enough symbols to represent both long and short vowels.[6]

The imperfect match between phonemes and letters in some modern languages can be explained in a number of ways. The Greek (or Latin) alphabet was not altered sufficiently to account for all the phonemes of the newly written language; for instance, English has never consistently distinguished between [ð] and [θ], although it had sufficient symbols in the early Middle English period to do so--thorn (þ) and eth (ð) could each represent either the voiced or the voiceless dental fricative. In addition, the conservatism of scribes caused (and still causes) them to write words down as they had seen them written, not as they sounded. This tendency, combined with the inevitable phonetic change in any language, eventually changes the relationship between sound and spelling, as it has in the case of the 'mute e' in English words like bite, a letter which was pronounced in Middle English. And in English especially there has been a

tendency to spell (and respell) words etymologically, so that English debt reflects the b in Latin debitum, although the b has never been pronounced in English, and the Middle English spelling dette more accurately reflects the pronunciation. (The changing relationship between English spelling and pronunciation has been discussed in detail in Chapter I).

For the traditional phonemicist, then, a one-letter-per-phoneme correspondence is optimal: a phonemic representation is the most efficient possible representation of the (traditional phonemic) phonology of the language because the phoneme inventory of the language is the minimum number and variety of units which can be accurately and consistently used to represent the pronunciation. Departures from the phoneme-letter correspondence can be attributed to historical accident and the pressures of regular phonetic change without corresponding change in spelling (Bloomfield, 1933: 291-293).

The optimum efficiency of a phonemic representation of the pronunciation of a language is the direct result of the methods used by American structuralists in establishing phoneme inventories (the epitome of which is the discovery of minimal pairs like bit-bet) and of the clearly stated definition of Prague school linguistics of the phoneme as the unit of contrast in phonology. From the point of view of traditional phonemics, therefore, a phonemic alphabet is the most efficient way to represent the phonology of a language.

The question to be raised is whether the pronunciation is what an alphabetic system should represent. It is clear that English spelling at least in some cases is morphophonemic rather than phonemic. The letter c, for example, having no peculiar phonetic or phonemic interpretation, is ideally suited to represent the morphophonemic alternation between [k] and [s] in electric-electricity. Because of the French influence in opaque-opacity, the c reflects only the [s] part of this alternation, the [k] member being represented by the French spelling -que.

The c spelling of electric can be seen as representing a more abstract level of the phonology than the traditional phonemic level. It can be seen as representing the morphophoneme which is realized as either [k] or [s], depending on whether or not it is followed by the morpheme -ity.

In traditional phonemic theory, it is the morphophonemics which accounts for the allomorphic variation--such as the three regular variants of the English plural, [z], [s], and [z]--found in most languages. According to Trager and Smith (1957: 60), 'a full study of English morphophonemics and vowel sequences that occur, the relation of certain stresses to specific segmental phoneme structure, and the relation of intonation to the stresses and junctures; then would follow a morpheme list with all allomorphs, and an indefinitely extendable list of morphemes not showing alternation.' Some linguists use morphophonemes in situations like that in knife /nayF/, in which the /F/ represents a morphophoneme which may be realized as the phoeme /v/ when

followed by the plural morpheme, and the phoneme /f/ elsewhere. Traditional structural phonology, however, does not postulate a 'morphophonemic level' or representation. For Harris (1951: 219) the morphophonemic symbol is a device for marking 'the more common phonological alternations in a language.' The morphophoneme, then, is a convenient cover symbol for regular phonological alternations which, together with specification of morphemic environments and realizations, predicts those alternations.

The two current theories which have developed this phonological level have both discarded the term morphophoneme. Stratificational grammar uses the term morphon for the segments at this level, and generative grammar uses the term phonological representation or, for some linguists, systematic phoneme. The stratificational treatment of morphophonemics is far more complex than the clause above indicates, and I shall discuss its ramifications later in this chapter. The point to be made here is that, if we proceed from grammatical to phonological units, it is at the level of morphons or phonological representations that morphemes or lexical items (depending on the theory) are first divided into segments. In other words, it is the most abstract level of phonology in either theory.

Generative linguists have suggested that, for English and French specifically, the orthography is near the underlying phonological representation, and is therefore optimal for the adult native speaker of the language. According to

Chomsky and Halle (1968: 49)'the fundamental principle of orthography is that phonetic variation is not indicated where it is predictable by a general rule. . . . Orthography is a system designed for readers who know the language, who understand sentences and therefore know the surface structure of sentences. . . . Except for unpredictable variants (e.g. man-men, buy-bought), an optimal orthography would have one representation for each lexical entry.'[8] Chomsky and Halle make no explicit claim that English spelling corresponds to the underlying phonological segments. They seem to doubt, in fact, that the phonemic representation of alphabetic writing, as opposed to their feature matrices, is 'psychologically real.' But their definition of an optimal system of orthography makes the units of the alphabet correspond to phonological segments at a level very near the underlying representation.

An important difference should be stated here between generative theory and the other theories of language under discussion. It is related to the well-known distinction between competence and performance made by Chomsky and other generative linguists. Generative theory is concerned not with manifest speech, but with what the 'ideal native speaker' knows about his language. This idealistic view of language accounts for the difficulty Chomsky and Halle have in relating alphabetic writing to a particular level of phonology.

Chomsky and Halle are working with what amounts to a sound-image of the phonological segment in the 'abstract symbols,' which are in fact 'informal abbreviations for certain complexes of feature' (1968: 10). The cautious negative statement of the principle of orthography quoted above, that the orthography does not indicate regular phonetic variation, makes no precise commitment as to what the orthography does indicate. It has been commonly assumed, however--and Chomsky and Halle's first approximation of the reading process (49-50) encourages this view--that units of conventional orthography correspond very roughly with the symbols of the phonological representation (the systematic phonemes of earlier treatments of generative phonology). There has been at least one thoroughgoing attempt to explore the implications of the comments Chomsky and Halle make about orthography--that of Klima (1972), which will be discussed later in this chapter.

Before turning to more specific discussions of the theories, it may be useful here to comment further on the notion of an 'optimal' orthography. English spelling has frequently been castigated for its failure to be optimal in the sense that it does not preserve anything near a direct correspondence to the pronunciation. This criticism has been echoed by traditional phonemicists and by teachers of reading everywhere, and, from their point of view, English spelling is indeed doubly inconsistent, preserving neither a sound-to-spelling nor a spelling-to-sound

correspondence (see note 4). This failure of spelling to correspond to pronunciation clearly does make the teacher's--and the learner's--task in language study more difficult; therefore, from the standpoint of one trying to learn English, the spelling system is not optimal. But the orthography may be optimal from other points of view than the teacher's and the learner's, as Chomsky and Halle suggest.[9] The English spelling system may be optimal (or nearly so) from the point of view of the adult who knows the language and the spelling system.

Chomsky and Halle's mentalistic linguistics echoes Sapir's earlier notion of the phoneme as mental image. Opposed to this was Bloomfield's apparent belief that the phoneme could be defined in terms of physical sound. Both these theories will be discussed below in the general discussion of phonological theory.

A work of major importance, from which I shall draw heavily for the discussion of American structural phonology, is W. Freeman Twaddell's monography,"On Defining the Phoneme" (1935). Twaddell in fact rejects the theories of American linguists mentioned above, along with the phoneme theory of Daniel Jones, in favor of his own definition of the phonemes as an abstract relationship. Although Twaddell writes in the structural tradition, he reacts against it in his monograph on the phoneme, and his reactions bring him close in his definitions to the phoneme of the Prague school.

Twaddell reacts in a manner characteristic of structural linguistics against theories which involve mentalistic or psychological definitions. He echoes Bloomfield (1933: 32-34) in his arguments against the 'mental image' definition of the phoneme. 'Any correlation of phenomena which can be established on the basis of mental entities or events can also, and more economically, be established on the basis of the phenomena themselves' (Twaddell, 1935: 57). The scientific method, he says (n. 8) is 'quite simply the convention that mind does not exist.' Specifically, he attacks arguments for the psychological reality of the phoneme on the grounds that they rely on negative evidence--the failure of subjects to record differently sounds (like the t in tone and the t in stone) which are phonetically different.

Turning to the linguists, including Bloomfield, who claim acoustical reality for the phoneme, Twaddell attacks their position largely on the grounds of the continuous nature of the acoustical record of speech.[10] It is considerably more difficult, however, for Twaddell to dispose of the theories of Bloomfield and Daniel Jones than to dispose of the 'mental image' theories. Bloomfield's phoneme, as Twaddell sees it, is a feature of the speech sounds, 'characteristic of all the speech sounds in question and characteristic only of these sounds,' while Jones' phoneme corresponds to the sum of all the speech sounds in question.

Twaddell rejects Bloomfield's 'minimum same of vocal feature' definition of the phoneme on the grounds that current research in acoustic phonetics had failed to demonstrate the feature which supposedly occurred in all instances of a particular phoneme (63-64).

Jones' definition of the phoneme as 'a family of sounds in a given language, which are related in character and are such that no one of them ever occurs in the same surroundings as any other in words,' fails to account for phonemic overlapping in cases like the vowel of dare and air in American English, which may be assigned to the phoneme in Mary or that in marry--in dialects where the vowels in these words are different (64-65). But Jones' definition was not intended to be 'the theoretical base for the study of phonetic relationships within a language' (65), but, instead, is intended for practical use in phonetic transcription.

In addition, Twaddell rejects Morris Swadesh's treatment in "The Phonemic Principle" (1934) because it leaves open the possibility of arbitrary procedure. The assignment of the p in spill to the phoneme /p/ rather than to /b/ is arbitrary on the basis of phonetic similarity (66-67).

If the phoneme cannot be associated with either mental or physical reality, the alternative for Twaddell is to regard the phoneme as fiction. 'Although these two procedures of definition for the phoneme--regarding it as a physical reality of some order or as a mental (or psychological) reality--appear to represent the two possibilities, perhaps

they are only subalternatives of one of two possible procedures' (67). The alternate procedure is definition of the phoneme as an abstractional fictitious unit. This definition involves a complicated chain of thirteen interlocking definitions leading first to the micro-phoneme (in 9) and finally to the macro-phoneme, which most nearly resembles the previous notions of the phoneme.

Twaddell defines ordered classes of forms which have minimal phonological differences (as in the sequence beet: bit: bait: bet: bat). The minimum phonological difference he calls the micro-phoneme. The micro-phonemes /i/, /I/, /e/, /ɛ/, /æ/, in the above sequence are defined, then, as relationships, as minimum phonological differences, not as units.

The class pill: till: kill: bill demonstrates the micro-phonemes /p/, /t/, /k/, /b/. The class nap: gnat: knack: nab demonstrates a different set of micro-phonemes--different in that their articulatory specifications are not the same. The p in pill and the p in nap differ, for example, in aspiration. These two classes are similarly ordered, however, since the 'qualitative articulatory differences among the corresponding phonetic events are similar and in a one-to-one relation' (73). The p's in pill and nap share the articulatory phonetic features bilabial and voiceless; the t's in till and gnat share the features alveolar and voiceless; the k's in kill and knack, the features velar and voiceless; and the b's in bill and nab, the features bilabial and voiced. 'The sum of all similarly ordered terms (micro-phonemes) of

similar minimum phonological differences among forms is called a macro-phoneme' (73). The two ordered classes above, then, give us the macro-phonemes /p/, /t/, /k/, /b/.

In his Principles of Phonology (1969), written soon after Twaddell's monograph, N. S. Trubetzkoy responds directly to Twaddell's ideas. He rejects Twaddell's definition of the phoneme because he considers it unnecessarily complex, its complexity being due, he says, to Twaddell's apparent eagerness to avoid the danger of the phoneme's being considered a building block for words and sentences, rather than a relationship. He gives his own definition: ' . . . every language presupposes distinctive (phonological) oppositions. The phoneme is a member of such an opposition that cannot be analyzed into still smaller distinctive (phonological) units. There is nothing to be changed in this quite clear and unequivocal definition. Any change can only lead to unnecessary complications' (Trubetzkoy, 1969: 41).

Trubetzkoy's phoneme corresponds, as he says (42), exactly with Twaddell's macro-phoneme. From Twaddell's point of view, this definition leaves open the possibility of arbitrary procedure like that of assigning the p of spill to the same phoneme as the p of pill (or to the same phoneme as the b of bill, the second alternative). Since it is impossible, on the basis of acoustical or articulatory criteria, to assign this sound to either the p or the b macro-phoneme, Twaddell must assign it to a third phoneme:

'The stops of "spill, spare," etc. are significantly bilabial and stop, but not significantly voiceless; the stops of "pill, nap, tapper," are significantly bilabial, stop, and voiceless' (Twaddell: 74). Trubetzkoy and other Prague school phonologists avoid the problem of arbitrary assignment of sounds with the notion of neutralization and the archi-phoneme--the trademark of Prague school phonology.

In Trubetzkoy's book, Prague school phonology becomes explicitly the study of phonetic features ('properties' in the Baltaxe translation) and relationships. Most of the Principles of Phonology is devoted to defining and classifying the relationship between phonemes, which in turn are seen as bundles of distinctive properties. Perhaps because he does not limit his treatment to a particular language--nor, indeed, does he provide any extensive analysis or examples from any one language--the relational nature of his theory becomes especially clear.

It is the concept of neutralization and the archiphoneme which makes the relational nature of Prague school phonology especially attractive. Twaddell's solution of a third phoneme in the problem mentioned above leaves open the possibility of considering the phoneme as a piece from which larger phonological units are built--the notion which Twaddell was at such great pains to avoid in his definitions. To comprehend the concept of neutralization in phonology, one must have a concept of the phoneme as a relationship, or 'fiction' in Twaddell's term.

It is characteristic of Trubetzkoy's approach that he takes up the logical classification of distinctive oppositions (Chapter III) before he discusses the phonological classifications (Chapter IV). His phonetic properties are those now familiar to students of phonology regardless of their theoretical background. They include the basic division of features into vocalic, consonantal, and prosodic and the features of place ('localization') for consonants. Although some of Trubetzkoy's terminology may be unfamiliar, and his treatment of phonetics is more varied than most others, the notions and classification of the features are familiar.[11]

The logical basis of Prague school theory distinguishes it from the other theories like those of Sapir and Bloomfield, as well as that of Twaddell. The notion of neutralization depends on Trubetzkoy's initial classification of oppositions into bilateral and multilateral oppositions. In bilateral oppositions the sum of the features that the two phonemes have in common is common to those two phonemes alone; 'the basis for comparison of a multilateral opposition is not limited to the two respective opposition members' (Trubetzkoy: 68). It follows, of course, that only members of a bilateral opposition--like English p and b--can be neutralized.

The treatments of phonology by American linguists ignored the logical basis of phonological theory perhaps because they were largely concerned with discovery procedures.

Swadesh's sections in The phonemic principle (1934) on method, orthography, normalization, and phonetics are clearly written for the field linguist faced with the task of analyzing an unfamiliar language. Indeed, the phonemic principle itself was originally a part of a paper on Chitimacha phonemes, as Swadesh indicates at the beginning of the paper (32). Whatever the cause, emphasis on discovery procedures has come to be associated with American structural linguistics; an emphasis on logical structure and analysis has come to be associated with Prague school linguistics.

Twentieth-century phonological theories before transformational-generative phonology differed from each other in many ways (some of them indicated above[12]), but they had a common goal--identification and description of the phonemes of languages. There was also a general tendency to treat phonology autonomously, without considering the possible connections between phonology and grammar or semantics--the legacy no doubt of the neogrammarians' specifications of linguistic rigor.

Generative grammar introduced a number of changes that were startling in the context of the American structuralism with which it was originally placed in direct competition. Instead of the behavioristic 'no mind' approach of American structuralism suggested by Twaddell (above), generative grammar proposed to describe explicitly the ideal native speaker's knowledge of his language. This frankly mentalistic approach is derived at least partly from the mentalistic notions of

Sapir, which were rejected by Twaddell, a debt that Chomsky (1964) acknowledges.

A feature of generative grammar closely related to its mentalistic approach is its distinction of competence (what the ideal speaker-learner knows about his language) and performance (which is affected by such non-linguistic factors as fatigue and excitement).[13] The business of grammar is to describe the competence of the native speaker. In accounting for the speaker's intuition about his language (Chomsky, 1964: 63), the grammar must account for all possible forms. In phonology, this means that generative grammar claims to fill in phonological gaps; therefore, forms like /nis/ and /blik/ will be predicted, although they do not actually occur (they are meaningless) in English (Halle, 1962: 341).[14]

Generative phonology differs in several specific ways from American structuralist phonology. Halle (1959) provides an argument against the autonomous phoneme, and Chomsky (1964) amplifies his argument. (The status of the phoneme in generative and stratificational phonology will be examined in Chapter III.)

Although they relied on native-speaker intuition (in responses of 'the same meaning' or 'different meanings') in their establishment of phonemes, the American structuralists rejected mentalistic notions (and 'meaning' in general), and minimized the importance of the phonetic level. They tended to see the (autonomous) phonemic level as the structurally

significant level, and to view the phonetic level as non-linguistic,[15] although in practice they relied heavily on feature analysis and 'phonetic universals' (Chomsky, 1964: 92-93). Generative grammar, in contrast, seeks to develop a universal phonetic theory which will be incorporated into the phonology at the systematic phonetic level (Jakobson, Fant, Gunnar,and Halle, 1963; Halle, 1964; and Chomsky and Halle, 1968: 293-329).

At the top of the phonological component is the phonological representation, provided by the operation of the readjustment rules (Chomsky and Halle, 1968: 371-372) as the input to the phonological component. The phonological representation is rendered in phonological segments, which, in their turn, are matrices of distinctive features which are subject to successive, ordered rules which finally result in the systematic phonetic level, corresponding to the pronunciation.

A word, phrase or sentence may have written representations corresponding to its sequence of feature matrices after the application of each rule. This is called the derivation of the word. It begins at the most abstract level of the phonology, the phonological representation. The application of each successive rule brings the word closer to the surface level, and each representation is progressively less abstract. Thus, the derivation of <u>ambiguity</u> (Chomsky and Halle: 195):

æmbig+u+ity

æmbig+ɪ̄+ity

æmbig+ɪ̄w+ity

æmbig+yɪ̄w+ity

æmbig+yūw+ity

The segment undergoing the change in this sequence is /u/, which is the cover symbol for the following feature matrix (176):

/u/	vocalic	+
	consonantal	-
	high	+
	back	+
	low	-
	anterior	-
	coronal	-
	round	+
	tense	-

Chomsky and Halle's features at this point--the phonological representation--are not 'phonetic' in the sense that they have a pronunciation. Features are defined in articulatory terms only at the lowest--systematic phonetic--level. Above that level they are abstract categories. Each place in the phonological matrix represents a category and its component (165). The category [+tense] has as its complement [-tense].

In the derivation above, the segment /u/ undergoes a tensing and unrounding rule, making it $\begin{bmatrix}-\text{round}\\+\text{tense}\end{bmatrix}$, and yielding

the second representation [æmbig+$\bar{\text{ɪ}}$+ity]. A rule of diphthongization adds the segment [w], in features:

[w]	vocalic	-
	consonantal	-
	high	+
	back	+
	low	-
	anterior	-
	coronal	-
	round	+
	tense	-

This yields the third representation [æmbig+$\bar{\text{ɪ}}$w+ity]. A [y]-glide is added to this form in features:

[y]	vocalic	-
	consonantal	-
	high	+
	back	-
	low	-
	anterior	-
	coronal	-
	round	-
	tense	-

This yields the form [æmbig+y$\bar{\text{ɪ}}$w+ity], to which a rounding rule applies, changing [$\bar{\text{ɪ}}$] to [$\bar{\text{u}}$].

vocalic	+
consonantal	-
high	+
back	+
low	-
anterior	-
coronal	-
round	+
tense	+

This finally yields the surface form [æmbig+yūw+ity]. From the underlying phonological /u/, the rules supply [yūw]. In features:

/u/	----→	[yūw]
+	vocalic	-+-
-	consonantal	---
+	high	+++
+	back	-++
-	low	---
-	anterior	---
-	coronal	---
+	round	-++
-	tense	---

Since each phonological phrase undergoes the application of rules as a unit for rules involving stress in English (the 'transformational cycle' in Chomsky and Halle), and the word undergoes the remaining rules, each phonological

phrase or word has its unique derivational history. Since the language does not move monolithically through the rules, it makes no sense to attempt to describe a level at which a representation can be made for the language as a whole between the phonological and systematic phonetic representations.[16]

The above derivations illustrate the componential nature of generative phonology. It lacks a segmental aspect--phonotactics or alternation patterns. The segments are supplied at the top of the phonology by the lexicon and the readjustment rules. Admissible segment sequences are specified by the phonological rules.

The alphabetic representation of English corresponds roughly to the phonological representation for Chomsky and Halle. In the example above, /æmbig+u+ity/ is nearly identical with the spelling of the word it represents, ambiguity; the only segment which does not correspond with the spelling is /æ/, for which the letter a is always the English spelling. The phonological representation of tabular (Chomsky and Halle: 197) is /tæbl+ær/, reflecting the stem table. The spelling corresponds more closely to the form of the word after the application of a rule that inserts [u] and a laxing rule which yields the form [tæbul+ær].

Chomsky and Halle do not state a direct equivalence between the spelling and the phonological representation, however, as I have stated. They take the more cautious path

of defining the principle of orthography in negative terms, suggesting that it should not reflect phonetic variation where that variation is predicted by a general rule (49).

Halle develops the principle, stating it as, 'orthographies must contain no symbols that reflect the operation of phonological rules' (Halle, 1969: 19). The difference between phonetic [s] and phonetic [z] in consign and design, respectively, is predicted by a phonetic rule (intervocalic voicing), and therefore is not represented in the orthography. Double consonants--not pronounced in English--may also have a function in the orthograph as they do in the phonology. The ss sequence in dissent or dissemble blocks the voicing rule, mentioned above, yielding unvoiced [ss], which is then reduced by another rule to [s]. The orthographic representation ss, then, reflects the phonological representation before the application of the rules, according to the principle (21).

It is interesting to note that this principle of orthography also finds a legitimate use for the letter c. While c has no distinct sound of its own, always taking the sound of k or s, this very fact makes it the ideal symbol for the [k]-[s] alternation in electric-electricity, medical-medicine, and vocal-vociferous.

Klima (1972) has further pursued the generative orthographic principle. He suggests four additional principles in the creation of an optimal orthography: (1) minimal arbitrariness in representation, (2) minimal redundancy,

(3) sufficient ambiguity or expressiveness, and (4) standardization (61).

Alphabetic writing is necessarily minimally arbitrary, as compared with the ideographic of pure syllabic systems. Alphabets represent the essential segments of the language, rather than the larger and more numerous elements of syllables and words. Although an element of arbitrariness is necessary in representing phonological segments with graphic symbols (a change from an essentially auditory--albeit abstract--image to a visual image), alphabetic writing reduced arbitrariness to a minimum by representing the least numerous and most frequently repeated elements of language, the phonological segments. This reduces the number of graphic symbols to a minimum, making the load on the memory of the language user as small as possible.

Of course, it is possible for the orthography to indicate distinctive features--p and b are clearly related in the printed version of English orthography (and in the orthographies of all other languages using the Latin alphabet). A system that is too thorough in representing the features, however, runs the risk of violating the first principle of orthography and representing automatic features.

This unnecessarily phonetic representation also leads to violation of the principle of economy or minimal redundancy. It would make little sense to have three representations for the three phonetic k sounds that occur in English (Klima, 1972: 64): medial in cop, back, labialized in coop;

and palatal in keep.[17] The principle of economy in effect is the same as Chomsky and Halle's orthographic principle.

The principle of expressiveness allows the distinction of homophones in spelling, as in there and their in English, and the principle of standardization requires the same word to be spelled the same way wherever it occurs.

Klima experiments with a number of possible interpretations of Chomsky and Halle's orthographic principle. He demonstrates that the relationship between the spelling of English and any level of the phonology is anything but simple and straightforward. All the principles he suggests fall short of adequacy in spelling English. The underlying representation of fashion, for example, is /fac+ion/ (70). Tabbed, tapped, and patted would be spelled tabd, tapt, and patəd by a convention that would permit somewhat less abstract representations (71). A convention which allows the orthography to reflect everything except what is predicted by regular phonological rules--excluding only those phonetic effects ascribable to surrounding sound segments and internal or external word boundary (79)--yields the correct spelling of oblivion, but the incorrect spellings of rebelyon (rebellion) and crusyal (crucial).

Klima points out (72) that real orthographies often reflect the representation of the word rather than its sound form when the two diverge. For example, the spelling of the preterite morpheme -ed, cited above, reflects the unity of the morpheme, rather than the predictable [t], [d], or [əd]

phonetic forms. Thus, spelling in some instances may be only indirectly phonological.

At any rate, generative phonologists have demonstrated that spelling in a language like English (and presumably other languages as well) may be consistent at a level of language more abstract than pronunciation, although the optimal nature of the English spelling system has yet to be conclusively demonstrated--in fact, English spelling reflects different levels at different times, as the examples cited here indicate. Phonologists have suggested that in fact orthography should not reflect the pronunciation, since the language may be more economically represented at more abstract levels.

While traditional structural linguists insisted on viewing writing as the representation of the pronunciation or the phonology, rather than talking about the pronunciation of the spelling, the generative interpretation of orthography has made this distinction as parallel manifestations of an abstract level of language, so that it makes as much sense to talk about the pronunciation of the spelling as it does to talk about the spelling's representing the pronunciation.

King, in his chapter on scribal practice (1969: 203-213), discusses the competing notions that scribes tend to represent autonomous phonemes on the one hand (if the analyst is a traditional phonemicist), or deeper phonological segments on the other (if the analyst is a generative phonologist). Scribal practice, however, is so inconsistent--as in fifteenth-

century English manuscripts--that it is difficult to explain it consistently on any basis.

It should be observed here that the scribal practice described in King (1969) is a problem of historical linguistics, while the optimal orthography of Chomsky and Halle and of Klima (as well as of traditional phonemic theorists) is a problem of theoretical linguistics. Optimal orthography is a question of competence in writing, to use generative terminology, whereas scribal practice is a matter of performance. The two areas should illuminate each other, but they cannot be expected to be identical. Historical linguistics must account for occurring data, while theoretical linguistics attempts to find the abstract system behind the data, which is then used to organize and describe the data.

Stratificational theory is an alternative to generative theory at all levels of analysis, although it has perhaps been most consistently developed in phonology. The success that stratificational grammar has had as a basis for machine translation (see, for example, Lamb, 1964) recommends it for attention if it had no other appeal. But the theory has more to recommend it than this basis, and it has many ancestors other than the computer.[18]

One feature of stratificational grammar that sets it apart from generative grammar is that it rejects the strict distinction made by Chomsky and others between competence--what the speaker knows--and performance--what the speaker actually produces. This feature is central to Algeo's

(1970: 266-268) classification of stratification grammar as 'process-oriented' as opposed to 'system-oriented' generative grammar.[19]

Another important distinction is that stratificational grammar does not have 'rules' in the same sense that generative grammar does. The rules of generative grammar are unidirectional, moving (in phonology) from the more abstract phonological representation to the more concrete systematic phonetic level (the pronunciation, in effect). The lines and nodes of stratificational grammar define relationships and are bidirectional. In the part of the grammar relevant here, the morphemes of the morphemic sign pattern are related to morphons (morphophonemes of earlier theories), which are related to phonemes by way of the morphonic alternation pattern. Phonemes in turn are related to phonons (phonetic features) at the bottom of the phonotactics. This is the 'realizational' portion of the phonology. In addition, each stratum has a tactic pattern, which is the combinatory element of that level, specifying the order of the elements, so that the stratificational scheme may be presented in the form of Figure 1.

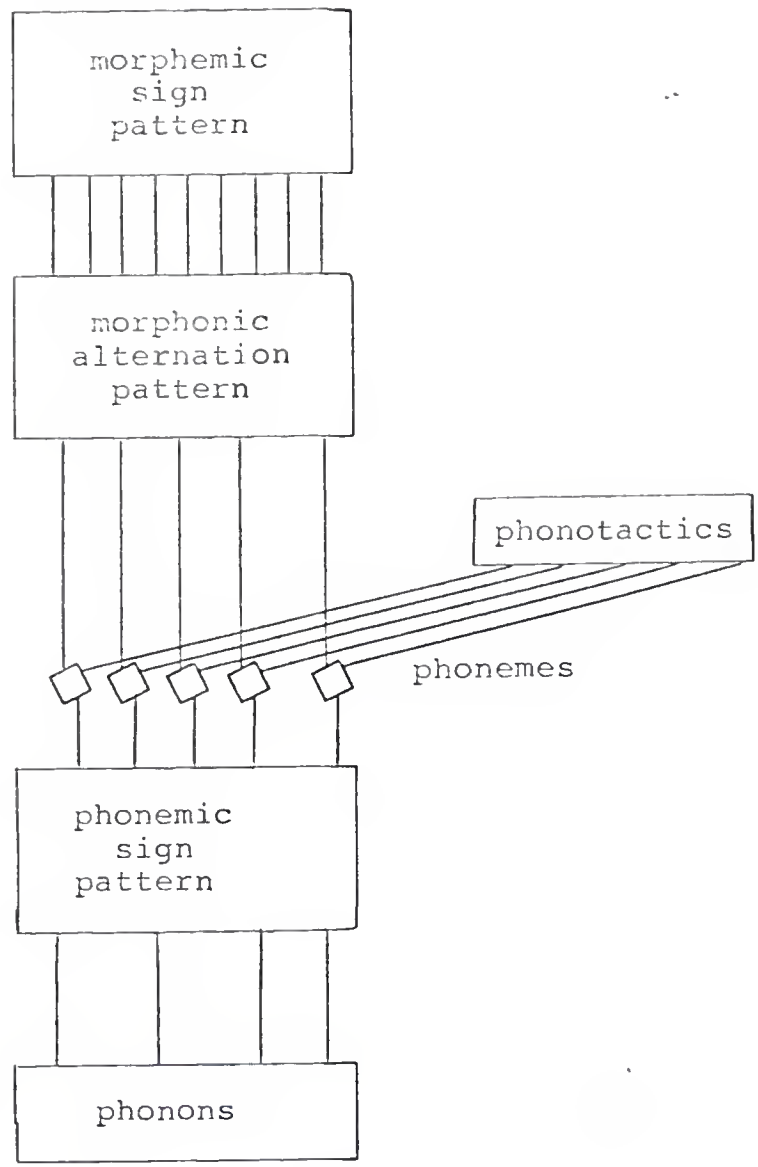


Figure 1

The Scheme of Stratificational Phonology

Stratificational linguists have not declared an orthographic principle.[20] But the nearest equivalent to the phonological representation of generative grammar is the morphonic level. This level, the downward component of the morphemic sign pattern, consists of what were formerly called morphophonemes. The morphonic alternation patterns have traditionally been called morphophonemic.

It is at this level--morphonic for stratificational grammar and phonological representation for generative grammar--that the two theories show perhaps their greatest similarity. Stratificationalists have done relatively little work with the English language, but, when work is done with English, the morphonic level will no doubt be very similar to the phonological representation of Chomsky and Halle.

The morphonic level, like its ancestor, the morphophonemic level,[21] contains morphemic elements before they are distinguished into their variant phonemic forms--the plural morpheme is represented on the morphonic level probably as /z/,[22] the preterite as /d/. The morphophonemic variation in inflectional suffixes in English is easy to demonstrate. What may not be immediately obvious is that the morphonic level will reflect the same conservatism that the generative phonological representation does. For example, sane and sanity would have different vowels (/ej/ and /æ/, respectively) on the phonemic level, but the same vowel at the morphonic level.

The disagreements between generative and stratificational grammar involve almost all levels and aspects of language--the overall structure of the theory; the existence of morphemic, lexemic, and sememic levels; the existence of the 'autonomous' phoneme; and the nature of phonetic features--except this one. Insofar as the phonological representation of generative theory can account for spelling, then, stratificational theory can also account for it.

Perhaps it should be borne in mind that the process of creating an orthography in a state of linguistic naivete--a state in which most orthographies were in fact created--makes the resulting system very much subject to confusion or prejudice on the part of the scribe, not to mention the adequacy (or inadequacy) of the available symbols. Thus, with the French influence in Middle English, English scribes learned to distinguish f and v in the spelling, but French had no [ð] or [θ] sounds, and so the distinction, which became phonemic in Middle English, found no representation in the spelling. Finally, the print imported from France by William Caxton contained no letter to represent either the voiced or the voiceless dental fricative--which, of course, did not exist in French. So, after some experimentation with y (ye for the), [ð] and [θ] both came to be represented by the digraph th (see Chapter I).

Historical accidents lead to inconsistencies of the kind just mentioned, in which one voiceless-voiced pair (f and v) is distinguished in the spelling, but another

([ð] and [θ]) is not. Another kind of difficulty is that English spelling is often unaccountably phonetic. The voicing alternation in knife-knives is reflected in the spelling, although in the similar house-houses and bath-bathe, it is not.[23] If we accept the underlying form of the preterite and plural, with Shibatani (1972), as /d/ and /z/, respectively, the -ed spelling in all regular verbs and the -es spelling after sibilants in nouns are unnecessarily phonetic in the generative view.[24]

Both these kinds of inconsistency have their roots in the history of the language and the origins and development of the spelling system. There are also relics in the spelling system of sounds that have been lost. The initial k of knife and knight, for example, were pronounced in Middle English, and the spellings of beet and beat reflect a distinction in pronunciation that died out in the seventeenth century.

A different and important kind of non-phonological phenomenon in English spelling is a number of patterns of some generality which do not directly reflect the phonology, but are part of the spelling system as distinct from the phonology. These include the gh spelling in knight which, while it is a relic like k, serves to indicate a preceding long (or tense) vowel. Similarly, single consonants followed by 'mute e' indicate a preceding long vowel, and double consonant letters, also for historical reasons discussed in

Chapter I, indicate preceding short vowels in stressed syllables--mate has tense [ej] and matter has lax [æ].

Finally, there is a certain amount of spelling irregularity which may be accounted for by the historical source of the word, but not by the phonetics of English phonology at any stage. The double c of accommodate accurately reflects the Latin pronunciation of double consonants, but its sixteenth-century adoption into English (OED) came long after double consonants had ceased to be pronounced in the thirteenth century. Furthermore, following an unstressed vowel as it does, it can indicate nothing about the quality of the vowel (normally reduced to schwa).

There is a large number of elements, patterns, and relics of various kinds in English spelling which would undoubtedly be counted as irregular in any theory of phonology. Nevertheless, much of what has been condemned about English spelling--such as the letter c with no single phonetic value, and the letter a used to represent both the [æ] of telegraph and the [ə] of telegraphy--can in fact be seen to be perfectly regular at the morphonic or phonological level.

Notes

[1]In Chinese, the morpheme and word are nearly identical, the major form of morpheme combination being that of compounding. There are only a few restricted exceptions like the men plural ending applicable only to personal nouns and pronouns like wo 'I' (women 'we'), and haidz 'child' (haidzmen 'children').

[2]See Samuel E. Martin (1972) for a detailed discussion of the Japanese writing system.

[3]It may be of interest to note that, in a structuralist or Prague school phoneme inventory, standard French and standard English have about the same number of phonemes--forty, more or less, depending on the authority cited--with an especially large number of vowels. Spanish and Italian, on the other hand, have relatively few phonemes, especially vowels.

[4]In French a single pronunciation may be represented by more than one spelling; for example, o: may be spelled au or eau; a may be spelled en or an, but a given spelling generally has only one pronunciation. In English, as beet, beat, weather, illustrate, the irregularity goes both ways--more than one spelling is possible for a given sound, and more than one pronunciation is possible for a given spelling.

[5]The distinction is often made between letter, on the one hand, and grapheme or spelling unit, on the other. Letters are members of our familiar twenty-six unit alphabet, the abc's. Grapheme and spelling unit are both used as technical terms to indicate the graphic representation of language; they are used to avoid the confusion that may be brought on by the fact that combinations of letters may represent single segments, as in English th and sh for [θ]-[ð] or [s], respectively. Grapheme, as used by Kurath (1964), for example, seems to indicate the representative of the phoneme, while spelling units, used by Venezky (1965, 1970) indicates a spelling system which is more independent of the phoneme system, having its own rules and patterns. This distinction reflects a disagreement among linguists as to the status of alphabetic writing either as a direct representation of the phonology or as a system parallel to but independent of the phonology. I shall discuss this question later. I believe that, for the purposes of this discussion, the terms letter and alphabet gain in comprehensibility and familiarity what they may lose in precision. They are useful because they preserve the ambiguity in the meanings that grapheme and spelling unit separate--they can be used to indicate either phoneme-representative systems or more independent systems. I have found no reason at this point

to be in total agreement with either interpretation; therefore, I shall use the terms letter and alphabet as unambiguously as possible to indicate a segmental spelling system which may be either phonological or independent.

[6]The relative recency of this view of the relationship between ancient Greek spelling and pronunciation is attested by the bitterness of the quarrels in the sixteenth century between those who wished to change the academic pronunciation of ancient Greek to make it fit the spelling, and those who wished to preserve it in the contemporary Greek pronunciation (see the Introduction).

[7]English spelling here represents the alternation at the phonemic, not the morphophonemic, level.

[8]The last statement in this quotation echoes the frequent observation that English tends to spell the same morpheme in the same way whenever it occurs, regardless of changes in pronunciation.

[9]Kiparsky (1975: 277) remarks that language may be optimal in one of three ways--from the standpoint of encoding, from that of decoding, and from that of learning. It cannot be optimal in all three ways at once, and the resulting tendency toward the optimum in all three areas causes the constant change that we know to be a fact of language.

[10]Bloomfield's definitions of the phoneme are sufficiently ambiguous for Fudge (1970: 80) to identify them with the 'functional' view, which includes Trubetzkoy and, probably, Twaddell.

[11]The great variety of languages cited in Trubetzkoy's book leads to a far greater degree of refinement in the system of features than is generally necessary for the treatment of a single language, or a small group of languages.

[12]There are two European theories of phonology I have not covered in this chapter because they do not seem to have an important bearing on the subject--the relationship of alphabetic writing to phonology. They are the prosodic analysis of J. R. Firth and F. R. Palmer, and the glossematics of Louis Hjelmslev and his followers. A brief discussion of both theories can be found in Fudge (1970), and the origins of prosodic analysis have been treated extensively by Langendoen (1968).

[13]The competence-performance distinction is similar to, but not identical with, the langue-parole distinction of Saussure and the habit-behavior distinction of Hockett, as Algeo (1970: n. 6) points out.

[14]Although generative phonology claims to fill in phonological gaps, stratificational linguistics claims that this is not possible without a phonological base (tactics) to define the possible combinations of segments (William J. Sullivan, personal communication).

[15]Prague school linguistics developed phonetic theory more fully than American linguistics. This phonetic theory has been employed more recently in the phonemic theories of Mulder (1968) and Martinet (1960, 1962).

[16]Sanford Schane has found the phoneme alive and well, not between the top and bottom of the derivational chain, but at the systematic phonetic level. He observes (1971: 520) that generative grammars generate an 'explicitly broad phonetic representation, which, implicitly, is a representation of surface contrasts.' The output of generative phonology is therefore often almost identical with traditional phonemic representation.

[17]The fact that cop, coop, and keep have two different representations for /k/ is due to a rule of spelling that is only partially phonetic, that c has the value of /s/ before i and e. The reason for the development of this rule lies in the French influence on English spelling, discussed in Chapter I.

[18]Lamb acknowledges his debt especially to Hjelmslev in his Epilegomena to a theory of language (1966a).

[19]Algeo (1970) outlines this and other ways in which stratificational grammar differs from generative grammar--the number of parallel generative mechanisms (strata)--six for English--and the nature of the 'rules' connecting the levels.

[20]Stratificational linguistics is not likely to declare a principle of orthography like that of generative linguistics. The question of the level of the phonology to which spelling corresponds is considered language-specific. Czech spelling, for example, is phonemic (William J. Sullivan, personal communication).

[21]It may be of interest to note that the term morphophonemic was considered in earlier versions of generative phonology, along with systematic phonemic, for the level Chomsky and Halle (1968) call the phonological representation.

[22]Arguing in the generative framework, Shibatani (1972) concludes that /z/ is the underlying representation for the plural morpheme, and /d/ for the preterite.

[23]Of course, standard English spelling cannot make the voiced-voiceless distinction of bath-bathe. It has the letters s and z to make the distinction in house-houses, but English spelling practice follows French in generally using s to represent both [s] and [z] unless [z] is initial.

[24]These spellings reflect Middle English forms in which the vowel--in the ending of walked, for example--was pronounced.

CHAPTER III

IN DEFENSE OF THE PHONEME

The concept of the phoneme has been largely rejected as a theoretical reality by generative linguists since the arguments against it presented by Halle (1959) and by Chomsky (1964). However, as indicated in the previous chapter, some theoretical linguists have continued to find the phoneme to be a viable and important part of their theories. Lamb (1966b) has demonstrated that the phoneme is defensible; his arguments will be summarized below.

Algeo (1970) has pointed out that stratificational and generative linguistics are not arguing at cross purposes. He suggests that the 'system-oriented' generative grammar and the 'process-oriented' stratificational grammar in fact describe different, and perhaps compatible, aspects of language. I shall try to show in this chapter that the phoneme is a necessary consequence of a basic requirement of stratificational linguistics, while the presuppositions and form of generative theory make it difficult to have a clear formulation of a phonemic level in that theory.

The disagreement among theories over the viability of the phoneme has two bases: the question of the proper object of linguistic enquiry and the question of the form that the theory takes. The object of generative enquiry is

competence, or the rules that the native speaker knows which enable him to speak and understand his native language. Theories which espouse the phonema often take as their object of enquiry something like the Hjelmslevian notion of texts, or manifest language, and take as a linguistic procedure the analysis of texts. Lamb (1966a) took texts as the object of enquiry, with a view to describing the system underlying the production and comprehension of texts. More recently, he has suggested that the object also includes the information system that the native speaker knows which enables him to speak and understand his language. This notion is similar to the generative competence, but Lamb explicitly rejects the generative dichotomy between competence and performance.

The phoneme itself was, of course, conceived as a theoretical entity long before the distinction between competence and performance was made. The phoneme was well established in linguistic theory before the second world war. American linguistics of this period was behavioristic in its orientation.[1] The concentration of American anthropological linguistics from Franz Boaz through the second world war on the recording of languages foreign to the linguist encouraged a view that linguistic behavior was the proper object of linguistic endeavor. This concentration also encouraged the general procedural orientation of American structural linguistics, which Chomskyan linguists have found objectionable.

The procedural orientation of the American structuralists made the isolation of the distinctive sounds of a language--the establishment of the phonemes--the first necessary step in the analysis and recording of the language. It was this procedural orientation which led Bloomfield to state (1933: 20) that 'the only useful generalizations about language are inductive generalizations.' Attacks against phoneme theory have usually actually been attacks against the procedural bias of the theories which advocated the phoneme.

Halle makes one of the early arguments against the phoneme as a theoretical entity. He provides (1959: 19) 'six formal conditions which phonological descriptions must satisfy.' Conditions (3), (3a) and (3a-1) are central in his argument against the phoneme (pages 21-23):

> Condition (3): A phonological description must provide a method of inferring (deriving) from every phonological representation the utterance symbolized, without recourse to information not contained in the phonological representation.
>
> . . .
>
> Condition (3a): A phonological description must include instructions for inferring (deriving) the proper phonological representation of any speech event, without recourse to information not contained in the physical signal.
>
> . . .
>
> Condition (3a-1): Only utterances which are different are to be represented by different sequences of symbols. The number of symbols employed in all representations must be compatible with this objective.
>
> . . .
>
> Traditionally linguistic descriptions have contained both representations satisfying Condition (3) alone, and representations satisfying Conditions (3) and (3a). The former are usually called 'morphophonemic' to distinguish them from the latter, which are called 'phonemic.'

Condition (3a) is entirely procedural in its implications. Halle remarks that this condition is 'concerned with procedures that are essentially analytical.' He goes on to say that 'theoretical constructs are never introduced because of considerations that have to do with analytic procedures' in the sciences. Halle concludes (page 24) that condition (3a) must be eliminated from the list of phonological description because it 'sets up a distinction between phonemes and morphophonemes for the sole reason that the former can be identified on the basis of acoustic information, whereas the latter require other information as well.' This condition is an unnecessary complication in the theory which must be eliminated, and, with it, the phonemic representation.

I believe that all of the current linguists who recognize the concept of the phoneme would concur with Halle's argument that procedural considerations have no place in linguistic theory. Nor do any of these linguists admit anything like Halle's condition (3a) in their theoretical concept of the phoneme.

Current linguistic theories are as far as I know universal in their rejection of the procedural bias of earlier American structuralist linguistics, but some of these theories like stratificational linguistics still maintain the phoneme on other grounds than procedural ones. Halle's condition (3a) is related to the biuniqueness condition attacked by Chomsky (1964), stated in a way that

makes its procedural bias clear: phonemes must be established on the basis of purely phonetic information. A rejection of procedures of analysis must result in the rejection of this condition. But as Lamb (1966b: 132) points out, 'the type of use to which the principles were put must be distinguished from the principles themselves.' And the principle behind this condition remains a viable one in linguistic theory.

A complete survey of the generative theorists' objections to the phoneme must include a brief summary of Chomsky's (1964) conditions for 'taxonomic phonemics,' after which I shall turn to the arguments of stratificational linguistics for inclusion of the phoneme.

Chomsky sets up four conditions--linearity, invariance, biuniqueness, and local determinacy--for taxonomic phonemics, and claims that these conditions, particularly linearity and biuniqueness, lead to difficulties in the description of language.

Chomsky's linearity condition as stated (1964: 93) seems to forbid phonetic assimilation like the nasalized vowel of <u>can't</u>. Certainly this condition cannot be accepted in any theory of linguistics; and, according to Lamb (1966b: 132), it never was. The invariance condition, which requires that every occurrence of a given phoneme be accompanied by an occurrence of all the components (features) of the phoneme, was a requirement for some phonemic theories (see Lamb, 1966b). It is not necessary for a theoretical concept of the phoneme.

Chomsky's local determinacy condition (1964: 95), in which a phonemic-phonetic correspondence must be 'such that the unique phonemic representation corresponding to a given phonetic form can be determined by "purely phonetic" considerations, or perhaps, considerations involving only "neighboring sounds."' This is a restatement of Halle's condition (3a), mentioned above, which is a procedural prohibition, disallowing any but phonetic information ('without recourse to information not contained in the physical signal'). We are left with the biuniqueness condition.

Halle's conditions (3), (3a), and (3a-1), quoted above, are, together, a statement of the biuniqueness principle with the procedural bias of (3a). Chomsky's statement (1964: 94) is that the biuniqueness condition 'asserts that each sequence of phones is represented by a unique sequence of phonemes, and that each sequence of phonemes represents a unique sequence of phones.' He specifies further that 'each sequence of phonemes represents a sequence of phones that is unique up to free variation.'

Lamb (1966b) embraces biuniqueness as a principle in linguistic theory while rejecting the procedural bias of the earlier American structuralists and of the conditions formulated by Halle and by Chomsky. Lamb (134-135) further formulates a distinctiveness principle for traditional phonemic solutions, which is 'that a correct C-phonemic solution treats two units (i.e., segments, syllables, or

the like) as phonemically different if and only if there is a distinctive phonetic difference between them.' Halle's condition (3a-1)--'only utterances which are different are to be represented by different sequences of symbols'--is very close to a statement of the distinctiveness principle.

For Lamb, the biuniqueness principle is a consequence of the distinctiveness principle. These principles in turn are a consequence of the principle of economy or simplicity (Lamb, 1966b: 158):

> . . . a phonological demonstration (as long as it is accurate, automatically adheres to the distinctiveness principle (hence to the biuniqueness principle) if it is free from excess surface information. The distinctiveness principle, then, is not needed as an independent criterion of acceptability of phonological solutions. The value which it imparts to a description as automatically provided by the simplicity principle. The status of the distinctiveness principle is therefore that of a practical device, a tool which can aid the linguist in arriving at the simplest possible description of a phonological system.

Lamb justifies the phoneme not on the basis of biuniqueness, nor of distinctiveness, but on the principle of economy of description. He demonstrates (147) that in the framework of stratificational linguistics the presence of the phoneme brings about a dramatic saving in the amount of information in a phonological description over that in a description which bypasses the phoneme.

The phoneme of stratificational linguistics is more abstract than that of traditional linguistics. It is the same size, but has its level of realization at the level of the traditional phoneme (Lamb, 1966b: 161).

A question presents itself at this point: if the objections to the phoneme are based on earlier phonemicists' procedural bias rather than on the phonemic principle itself, and if the phoneme can be justified on the grounds of economy of description, why is it not recognized as a unit of generative phonology? Generative phonologists' rejection of the phoneme results from the generative notion of competence, the rules a native speaker knows, as the object of linguistics, and from the generative interpretation of 'simplicity.'

A direct and flippant answer to the question above is that economy of description is not an issue in generative phonology. This answer is correct, but somewhat deceptive. Economy is not an issue in generative phonology in the same sense that it is in stratificational phonology, having been replaced by the notion of an evaluation metric. This metric is in turn a consequence of the third and highest level of adequacy for a theory described by Chomsky (1957 and subsequently), that of explanatory adequacy. A theory which has achieved explanatory adequacy can evaluate two descriptions which account for the same data (like two competing grammars of the same language) and decide which grammar is more highly valued.

This explanatory power is closely tied to the idea of universal grammar. That is, the evaluation criteria must be based on the common ability of all individuals to learn and use natural languages (Chomsky and Halle, 1968: 296-297).

The idea of universal grammar is related to that of competence, but the exact nature of the relationship is subject to debate. Some generative linguists feel that the phrase structure rules of the syntactic component are universal, some that the semantic component is universal; many feel, with Chomsky and Halle (1968) that there is a universal phonetics which must be used in evaluating phonological grammars.

What is universal in a grammar does not increase the complexity of a grammar; that is, it does not count in the evaluation metric. If the phrase structure part of the syntactic component could be shown to be universal, as suggested above, it would no longer be language-specific and would not be able to increase the complexity (lower the value) of the grammar in question. Only the transformation rules would be subject to evaluation.

In addition, the notion of universal grammar implies that not only competing grammars of the same language, but also grammars of different languages, may be compared as to complexity, and that it may be possible to say that one language has a simpler phonology than another. The evaluation criteria are applied to the rules of phonology to decide on their value, or cost. The invariance condition is suggested by Chomsky and Halle (1968: 168), for example, as a possible evaluation criterion. A phonology is simpler (higher valued) to the extent that it meets the invariance condition, and more costly (more complex, or lower valued) to the extent that it violates this condition.

Simplicity for generative grammar, then, is quite different, more complex, and less well defined than the principle of economy of stratificational linguistics. Stratificational grammar arrives at a measure of economy by calculating the surface information in the description. Generative grammar must discover the universals of language before evaluation is entirely within its grasp, but there is still no generally accepted evaluation metric in generative grammar.

Nor does surface information in the two theories represent the same aspects of language. Stratificational grammar represents language as a network of relationships (phonemes are relationshipd at a particular level of language) by a system of lines and nodes (see Chapter II and, for a brief description of stratificational assumptions and representation, Sullivan, 1974: 289-292). The phonetic rules of generative phonology represent phonetic processes which often correspond to phonetic changes in the history of the language in question. The phonology of Modern English in Chomsky and Halle (1968), for example, contains a vowel-shift rule which corresponds to the phonetic change which took place in the early Modern English period (discussed in Chapter I).

Since the rules of generative grammar describe processes, rather than relationships, symbol counting produces a measure less relevant to the value of a particular grammar than does the counting of lines and nodes in a stratificational

grammar. What is required is rather a set of criteria for evaluating the processes postulated by the rules; hence Chomsky and Halle's suggestion (above) that a grammar which conforms to the invariance condition be assigned a higher value than one which does not.

Perhaps the deepest difference of opinion between generative and stratificational linguistics concerns the object of linguistics--competence for generative linguistics, and the speaker's information system for stratificational. Chomsky (1972: 116) writes:

> . . . the technical term "competence" refers to the ability of the idealized speaker-hearer to associate sounds and meanings strictly in accordance with the rules of his language. The grammar of a language, as a model for idealized competence, establishes a certain relation between sound and meaning---etween phonetic and semantic representations. We may say that the grammar of the language L generates a set of pairs (s, I), where s is the phonetic representation of a certain signal and I is the semantic interpretation assigned to this signal by the rules of the language. To discover the rules of the grammar is the primary goal of the linguistic investigation of a particular language.

There are two ideas expressed here--that of competence as opposed to performance and that of rules. It is the concept of competence as a knowledge outside space and time that makes rules of the type used by generative grammar possible. Without this concept the rules would reflect processes with elapsed time--rules would be part of performance rather than competence.[2]

Rejection of the phoneme is not a necessary consequence of the adoption of competence as the object of linguistics. One may postulate, as Sapir did, that the phonemes are a

kind of mental image of the significant sounds of the language.

One of the problems generative linguistics presents for the phoneme is the fact that there is nowhere in the ordered rules of generative phonology that can be a phonemic level. This fact is a consequence of the notion of competence and of rules defining phonetic processes as the formal structures of the grammar. Schane reintroduces the phoneme as a unit of 'surface contrast,' but is definite (1971: 518) in his rejection of any phonemic level in generative phonology.

In fact, the phoneme described by Schane is nearly the same phoneme in size and level of abstraction as that defined by Lamb (1966b), and the examples cited by Schane, insofar as they represent synchronic description, can be translated fairly readily into stratificational form. Figure 2 shows the stratificational representation of Schane's example from French.

Schane distinguishes two kinds of rules, morphophonemic and phonetic, depending on their effect. Morphophonemic rules may convert one segment to another, as in the sane-sanity vowel alternation in English; they may show a derived feature, like nasalization in French, become contrastive on the surface (that is, in the phonetic representation); or they may reflect morphological conditioning, as in the English longer ('one who longs') and longer ('more long'). Phonetic rules do not give rise to surface contrasts, or

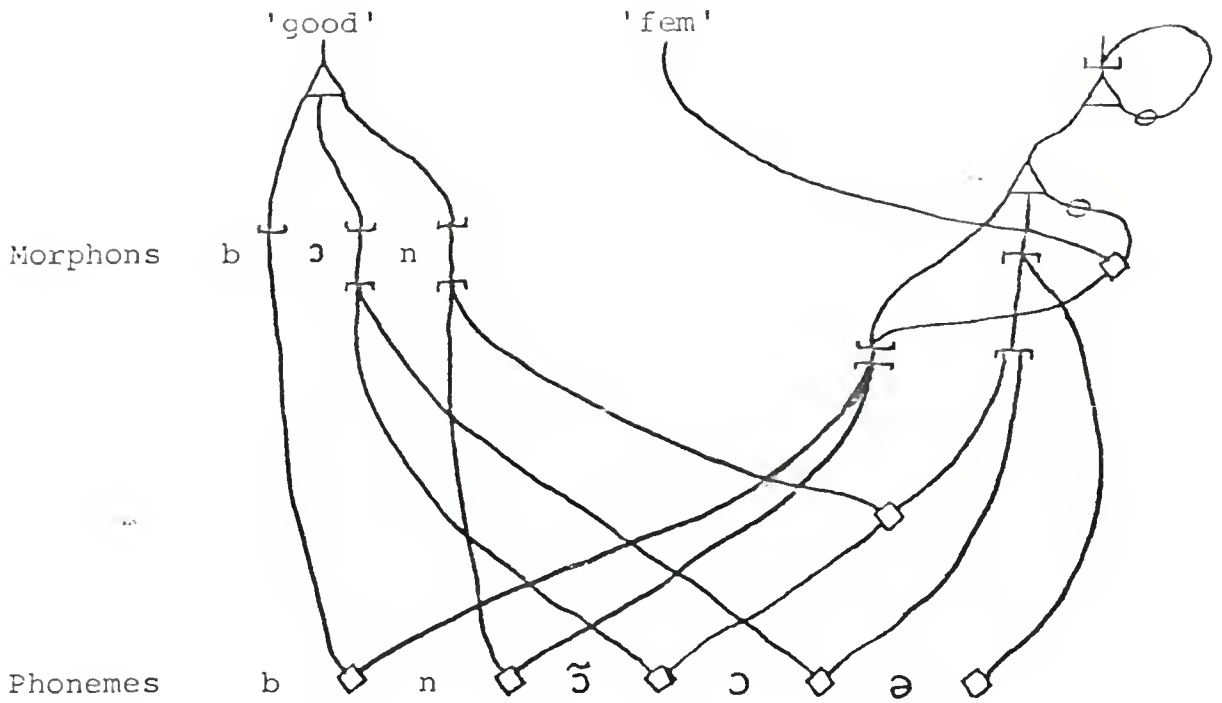


Figure 2

French Nasalization

give rise to contrasts which are not phonemic, like that of vowel length in writer-rider. In stratificational terms, morphophonemic rules define morphophonemic alternation; phonetic rules define sub-phonemic alternation.

A primary point of disagreement between generative and stratificational phonology is the rules and their content. Generative phonology defines alternations, subphonemic change and context, as well as what stratificational linguists would claim to be diachronic information, in the rules. Stratificational phonology describes alternations in the alternation pattern and contexts in the tactic pattern (as in Figure 2).

If Schane accepts the phoneme, he rejects the phonemic level (as mentioned above), which stratificational linguistics concludes is relevant. Schane's rejection is a consequence of the formal nature of the ordered set of rules in generative phonology; there are only two places a phonemic level could fit in generative phonology--at the top of the rules, or at the bottom. At the top of the rules, the underlying segments (or morphophonemes, in the terminology of some linguists) are too abstract to serve as units of contrast; in fact, they do not reflect contrasts like sane-sanity, by their very nature. The ultimate output of the rules, on the other hand, is indiscriminately phonemic or phonetic. This is the aspect of generative phonology that made it necessary for Schane to distinguish between morphophonemic and phonetic rules in order to distinguish phonemes in their output.

The absence of a possible phonemic level in generative phonology, then, is a consequence of the nature of the rules, and the rules are a consequence of the generative version of competence.

Lamb (1971: 13) suggests the term 'cognitive linguistics' for the kind of grammar represented by the stratificational model. He suggests that cognitive linguistics is 'concerned with representing the speaker's internal information system which makes it possible for him to speak his language and to understand utterances received from others.' Reich (1967) had previously attacked the competence-performance distinction, and Lamb (1971: 14-15) goes on to say that native speakers' knowledge of their language is 'competence to perform. . . . Thus, any linguistic theory qualifies as cognitive linguistics which aims to provide an account of language that can be used as a basis for a performance model.'

The difference between the generative competence and the stratificational competence to perform is evident in the kinds of relationships shown by the models of the two theories. The generative model has only the one-way arrow ($A \rightarrow B / X\_\_Y$), while the stratificational model has nodes representing two-way relationships <u>and</u> and <u>or</u>, plus the concept of <u>precedence</u> and the diamond node which occurs at the <u>-emic</u> level on any stratum (see especially Sullivan, 1974: 289).

The two-way model of stratificational grammar (upward from sound to meaning and downward from meaning to sound) is possible only for a theory that is a basis for performance. The phoneme in this theory is vital to the decoding part of the theory (upward), and the biuniqueness principle is a vital part of the concept of the phoneme. Biuniqueness allows phonetic features (phonons in stratificational terminology) to be related to more abstract units of phonology in a two-way relationship. The phoneme reduces the complexity of the model, functioning as a nexus between morphons and phonons.

The phoneme, then, is a necessary consequence of the assumptions of stratificational linguistics. Although it is not a necessary consequence of the assumptions of generative linguistics, it may be a part of generative phonology. The following chapters explore some of the possibilities of a phoneme like that of stratificational linguistics in English phonology.

Notes

[1]As witness Twaddell's (1935: 57) suggestion that the scientific method is the convention that the mind does not exist.

[2]Sampson (1970: 619) argues against a synchronic interpretation of Chomsky and Halle's rules on the basis of the competence-performance distinction.

[3]It is interesting to note that Wickelgren (1976: 246) defends the phoneme in the context of experimental psycholinguistics. 'The primary justification for phonemes is that they constitute a theory of segmental representation of words at some central point in the nervous system.' I believe this statement places Wickelgren's phoneme in generative linguistics' performance. But it is perfectly congruent with the information system of stratificational linguistics.

CHAPTER IV

PHONEMIC VOICE IN ENGLISH

The stratificational model's phoneme is sufficiently abstract to permit the simplication of obstruent clusters in English by separating voice from the obstruent phonemes. This can be done in a way similar to that in which it has been done for obstruent clusters in Russian (Sullivan, 1974). Earlier phonemic analysis required the phoneme to be at a lower level of abstraction, closer to that of the phonons, or phonological features, and so prevented the kind of treatment the phoneme has received in stratificational grammar. The treatment of voice as phonemic in English also involves neutralization, and hence the archiphoneme. This neutralization is described in the morphonic alternation pattern for obstruents, which is given in Figure 3.

The obstruents of English are paired for voice, and obstruent clusters are either totally voiced or totally unvoiced.[1] There are sixteen obstruent morphons in English, eight potentially voiced and eight voiceless. Beneath each potentially voiced morphon is an ordered and node with two downward branches. The first downward branch leads to a neutralization (an unordered upward or node) with the voiceless mate of the morphon; the second branch leads to the voicing phoneme, represented by Y, or, if that is not

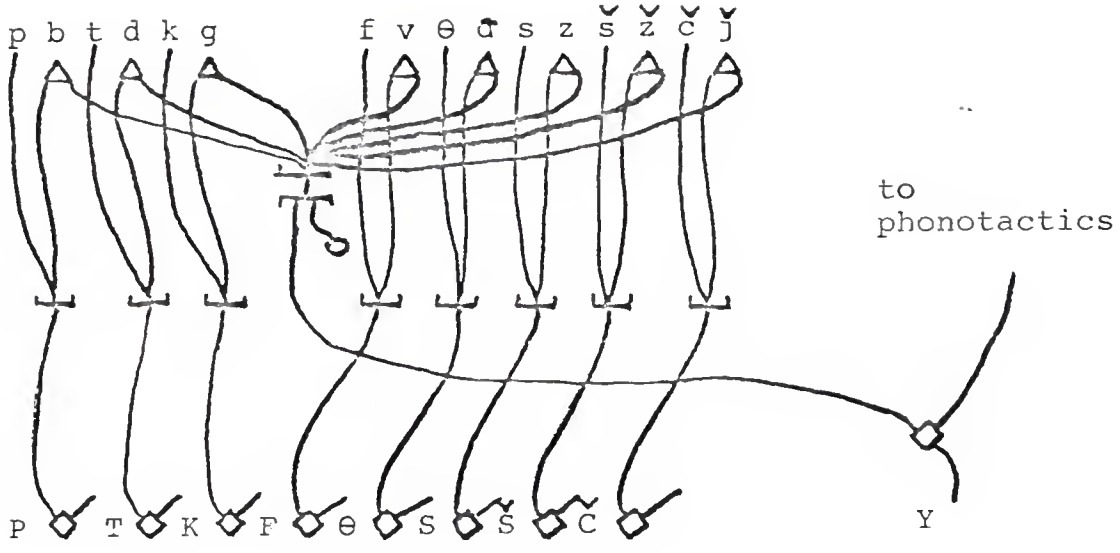


Figure 3

The Realization of English Obstruent Phonemes

possible, to nothing.[2] This means that in English the eight potentially voiced morphons are neutralized with their voiceless mates so that on the phonemic level there are eight obstruent archiphonemes in English, and a phoneme for voice. Voicing of obstruents and obstruent clusters is determined by the phonotactics.

In the tactics, clusters of two obstruents in the syllable-onset position must begin with [s] or [s], and must be voiceless. Another way of stating the facts is that, if the first consonant in a syllable-onset obstruent cluster is [s], the second must be [p], [t], [k], [f], or [θ], and the cluster must be voiceless, as in spit, stock, scoot, sphinx, and sthenic. Single obstruents may occur voiced or voiceless in syllable-onset position. Figure 4 gives the tactic diagram for syllable-onset clusters in English.

A syllable onset is optional, as indicated by the small circle around the line at the top of the diagram. If there is an onset it will be realized if possible as a two-obstruent cluster, from the ordered and node on the left. If this is not possible, the right-hand branch of the ordered or at the top of the diagram will be realized. It leads to a downward ordered and; the left-hand branch of the and leads ultimately to the single obstruents, and the right-hand branch, which is optional, leads to phonemic voice.

Figure 5 gives the diagram for syllable-final obstruents and obstruent clusters. Syllable codas, like

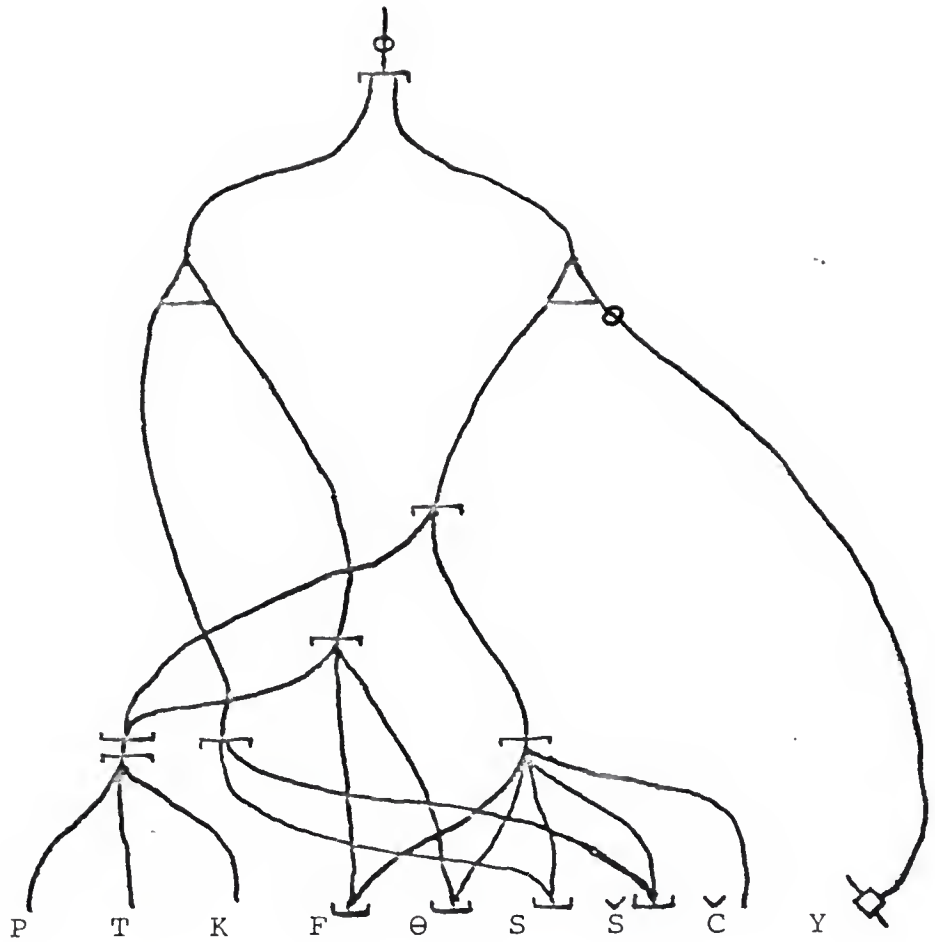


Figure 4

The Tactics of Syllable Onset Clusters

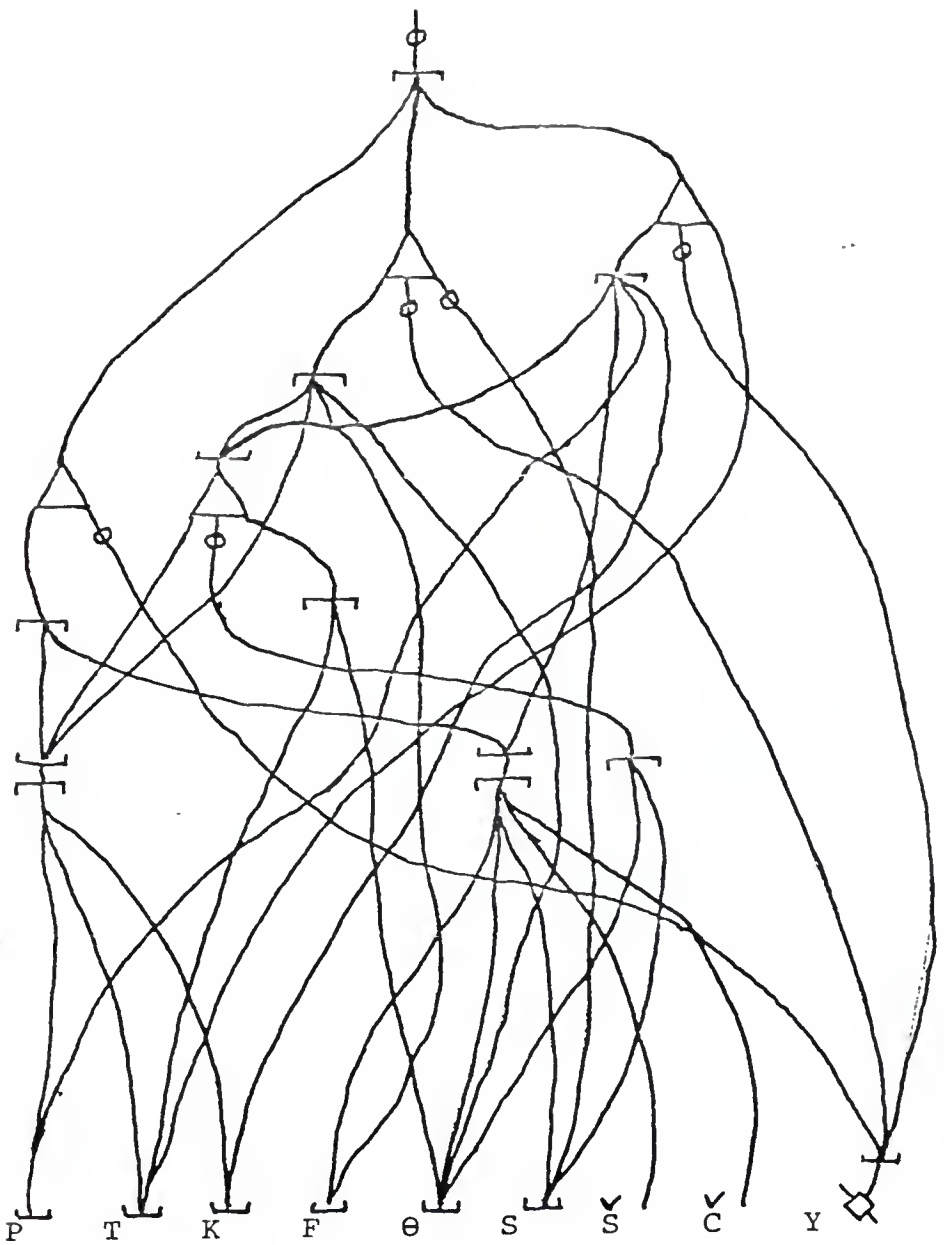


Figure 5

The Tactics of Syllable Final Clusters

syllable onsets, are optional. The left-hand branch of the downward or leads to an and node indicating optional voice, to another downward or, and to every single obstruent, indicating that any obstruent may occur syllable final, voiced or voiceless. The middle branch of the first downward or leads to an and node which predicts the four-obstruent cluster at the end of sixths, as well as the obstruent clusters at the end of sixth, length, and lengths and those of breaths-breathes and wife's-wives. The first downward branch leads to a downward or whose left-hand branch leads to another downward and. The three branches of the downward and lead first to the stop consonants, second (optionally) to /θ/ or /S/, and third to /T/ or /θ/. This predicts the final obstruent clusters of sixth, length, and depth, for example. The second alternative of the downward or goes directly to the stop consonants, and the third and fourth branches lead to /F/ and /θ/, respectively. The second branch of the downward and leads optionally to phonemic voice, and the third branch leads optionally to /S/, predicting clusters that end in /s/ or /z/ for the plural morpheme.

The remaining syllable-final obstruent clusters are predicted by the right-hand branch from the first downward or, which leads to a downward and. The first branch of this and leads to a downward or, and the left-hand branch from the or node leads to the and node described above, which predicts a stop, followed optionally by /θ/ or /S/, followed by /T/

or /θ/. The second branch from the downward or leads to the fricatives and affricate, /F/, /θ/, /S/, /Š/, and /Č/; the third and fourth branches lead to /P/ and /K/, respectively. These are followed by the second branch from the downward and, leading optionally to phonemic voice. The third branch from the downward and leads to /T/, which predicts clusters ending in /t/ or /d/ for the preterite morpheme.

The tactics for syllable-initial and syllable-final obstruent clusters are combined in Figure 6. At the bottom of the diagram the phonons have been added--Lb for labial, Ap for apical, Fr for fricative, Cl for closure, and Sp for spirant.

The separation of phonemic voice in English obstruents and obstruent clusters results in a considerable saving in the complexity of the description of English phonology. What would otherwise be an inventory of sixteen obstruent phonemes is reduced, by means of neutralization in the morphonic alternation pattern, to an inventory of none phonemes--eight obstruent phonemes and the phoneme associated with voice.

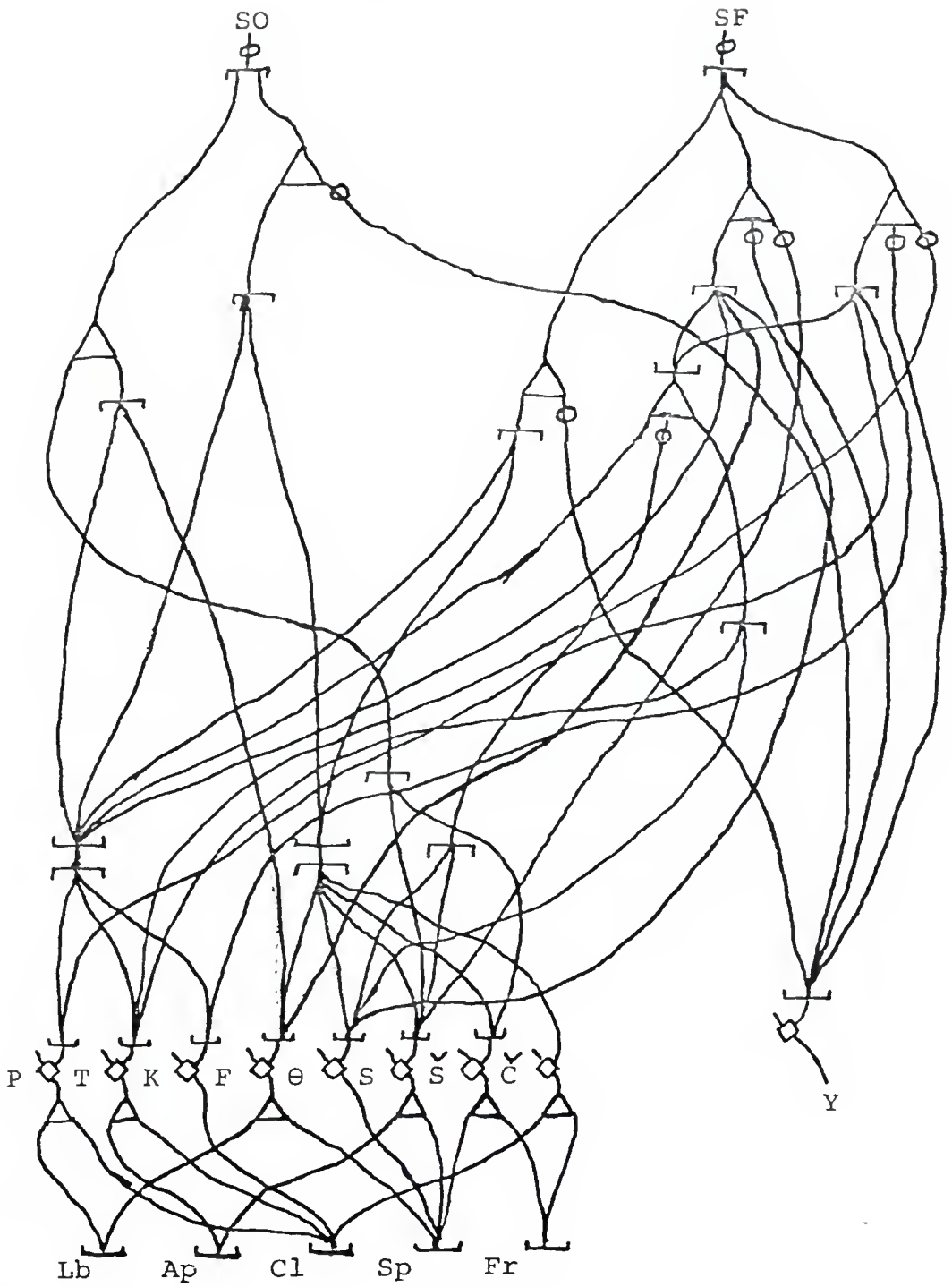


Figure 6

The Tactics of Syllable Onset Clusters
and Syllable Final Clusters Combined

Notes

[1]Obstruent clusters which extend over a syllable boundary are not necessarily completely voiced or completely voiceless; the central cluster in hatpin is entirely voiceless, but the central clusters in catbird and vodka have one voiced and one voiceless member.

[2]The phonemic element could be tension or even aspiration. The phonetic detail would be different, but the types of relationships would be parallel.

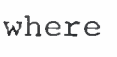
CHAPTER V

ROBINSON'S ALPHABET

The chapters of this dissertation, up to now, have dealt with the relationship between sound and spelling, with the status of the phoneme, and with the nature of phonemic voice in English. The inconsistency of the relationship between sound and spelling in English was the apparent motivation for Robert Robinson to invent the first phonetic alphabet over three hundred years ago. In the process of inventing and applying his alphabet, Robinson seems to have used (consciously or unconsciously) a phonological unit of roughly the size and level of abstraction of the phoneme, and to have used the device of aspiration to deal with phonemic voice in English.

The publication of Robert Robinson's The art of pronuntiation in 1617 marks the first appearance of a phonetic alphabet--that is, an alphabet intended not to replace the standard orthography of English, but to function as an auxiliary to aid in language study. Robinson's alphabet is in fact more phonemic than phonetic. It suggests a phonology seen in terms of discrete segments of phonemic size and level of abstraction, a system in which the treatment of voicing and stress suggest phonemic and subphonemic elements. Robinson's basic repeating unit is the syllable, as he declares in his book and shows in his transcriptions

(discussed below); to complete his analysis, Robinson invents an alphabet to represent the segments, the shape of whose symbols was evidently designed at least partly to reflect the articulatory similarities among segments, and partly to be as different as possible from standard orthography.[1]

I shall examine the visual structure of Robinson's alphabet, the phonemic equivalents of his symbols; then I shall turn to Robinson's application of the alphabet in his transcriptions to see what can be inferred of his system. Finally, I shall examine the implications of Robinson's system for the phonology of English and its relationship with English spelling. In discussing Robinson's transcription I shall give Robinson's symbols where necessary,  , with my transliteration between slant lines, /gwei:d/, and with a phonetic transcription, if necessary for clarity, in square brackets, [kweyt] or [kwəyt].

Robinson tells us on the title page of his book that his alphabet is intended 'to know the naturall structure of the voice, as speedily to learne the exact touch of pronunciations of any forraine language whatsoeuer.' The want of knowledge of speech and writing, Robinson says, 'has caused many imperfections and errors, as sometimes taking one simple sound of man's voice to be two, at other times taking two, three, or fower simple sounds to be but one, and according to that mistaken order fitting letters for them, whereby writing is thereby in some part made defective. . . .' He does on to say that he has assigned a letter to 'euery

simple sound in man's voice.' His system is not to replace or change the existing spelling of English. He wishes to 'paint out euery part of man's voice, that euery one might be severally discerned from others, and that the pronuntiation of euery different language which hitherto is chiefly taught by word of mouth might in a more certain maner be deciphered with the pen, wherby any that are desirous that way may not only the sooner learne the experience of any forraine language, but may also with more ease, and in a shorter time attaine to the true pronuntiation thereof.'

Little is known of Robinson other than The Art of Pronuntiation and the transcriptions he performed in his phonetic alphabet, discovered by Dobson in 1939. The very little we do know of Robinson outside these two works we owe to the painstaking research of Dobson. We know from the title page of the book that Robinson was a Londoner. Dobson's search of the records of Cambridge University turned up a Robert Robinson who matriculated pensioner in 1615 and graduated M.A. from Peterhouse in 1621, and a Robert Robinson--apparently the same one--is mentioned by Charles Hoole in A New Discovery of the Old Art of Teaching Schoole in 1660. This Robinson was known to teach four-year-old children to read from the Bible in six weeks or less. Dobson takes the effectiveness of his teaching of reading to indicate that he used a phonetic method (1947: 30-31).

What Robinson has left us, however, is not his phonetic method, but only his system as manifest in The Art of

Pronuntiation and the transcriptions. It is this system that will be treated in this chapter.

As for the forms of the symbols he chooses, he claims to have 'framed some few' himself and to have taken the rest from 'the Roman and secretary letters.' His object in the design of the alphabet, as Abercrombie (1967: 116) indicates, seems to be to avoid the traditional associations that would prejudice the reader in favor of a misguided pronunciation by making his symbols arbitrary (see note 1). Robinson's symbols and their phonological values are shown in Figure 7, arranged in the familiar place and manner of articulation format.

Clearly, Robinson's alphabet shows internal correspondences among the symbols which seem to be intended to reflect phonological and phonetic similarities. The symbol for the long and short vowels are inverted mirror images of each other except for the /i/-/i:/ correspondence, whose symbols are the Roman letter e and a symbol resembling the Greek gamma used arbitrarily to represent the front vowels.

In the stops and fricatives, the symbols indicate segments which do not make the voiced-unvoiced distinction of the English segments. The symbol for a bilabial (front) stop, for example, can indicate either [p] or [b]. Consonants in Robinson's system are voiced unless marked with the aspirate sign ʻ. The reasons for this notation, along with its advantages and disadvantages, will be discussed below.

Vowels

	back				front
'short'	u	ɔ	a	e	i
'long'	o:	ɔ:	a:	e:	i:

Consonants

	'outer region'	'middle region'	'inward region'
mutes	b	d	g
semimutes	m	n	ŋ
greater obstricts	v	z	ʃ
lesser obstricts	w	r	y
the peculiar		l	

aspirate ʻ

Figure 7

Robinson's Alphabet

The symbols representing stops (mutes) and nasals (semimutes) are intended to reflect the similarities in place and manner of articulation. Graphically, these symbols consist of a curved stroke, (or), and a single or double loop, C, J or 3. The bilabial stop is represented by the left-hand loop and stroke a; the alveolar by the inverted mirror image v, and the velar by the downstroke with a double right-hand loop B. The symbols for the stops can therefore be seen as conscious variants of each other. In addition, the nasal symbols are evidently designed to reflect the identical place of articulation of nasals and stops. The bilabial nasal is represented by the same downstroke and left-hand loop as the bilabial stop, with the addition of a half-loop to the right of the downstroke, æ; the alveolar nasal adds a second downstroke to the left of the symbol for the alveolar stop, w; the velar nasal likewise adds a downstroke to the left of the symbol for the velar stop nB.[2]

If the phonetic similarities among the stops and nasals are clearly and consistently reflected in Robinson's alphabet, other similarities are ignored or at least are not as clearly indicated. The similarity in place of articulation between the labial fricative (greater obstrict) and glide (lesser obstrict) is perhaps indicated by the common downstroke of u /y/ and r /w/. The fact that the symbol for /r/, ɐ, is the inverted mirror image of the symbol for the velar stop, B, is probably not intended to reflect phonetic similarity.[3] And if graphic similarity is intended

by Robinson between the symbol for the dental frictaive /ð/, ϒ, and that for the glide /y/, χ ; it is ironic, because Robinson's clarification of the dental fricative as the 'inward' member of a progression of fricatives beginning with the labial /v/ and progressing through the alveolar /z/ to /ð/ is the only feature of his system which is inconsistent with modern phonetic and phonological theory. The arrangement of the alphabet will be treated below.

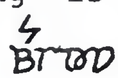
We can see that in its graphic design Robinson's system does in fact reflect at least some of the phonetic (as opposed to phonemic or phonological) data, specifically the features 'stop,' 'labial,' 'alveolar' and velar.' It also reflects the relationship between 'long' and 'short' vowels, as noted above. A further observation might be made that a number of the symbols show the influence of the Greek alphabet. The symbols for short and long /a/, ε and ϶, suggest epsilon; the symbols for /i:/, γ, and for /ð/, ϒ, both suggest gamma; and the symbol for /y/, χ, is nearly identical to chi. Furthermore, Robinson's choice of the diacritic ʻ to mark 'aspiration' (devoicing) strongly suggests the 'rough breathing' and 'smooth breathing' marks used over initial vowels in Greek.[4]

Turning from the graphic appearance of Robinson's symbols to the structure implied by his alphabet, the most striking feature of the system is Robinson's obvious concern with symmetry. It was apparently the desire to preserve the symmetry of five long and five short vowels, with a short

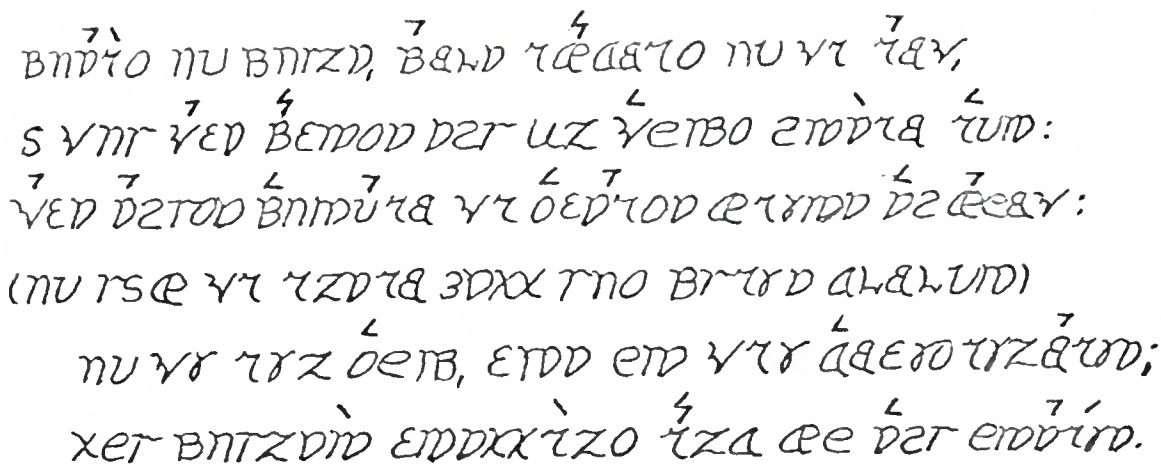
vowel corresponding to every long one, that led him to omit the reflex of ME o̅, probably phonetic [u:], from his system. As Dobson (1947: 41) points out, there would have been one long vowel too many. This vowel is represented by Robinson as a digraph /uw/, as in 𐑛𐑵, /duw/, 'do.'[5] There may have been yet another long vowel, [y:], which Robinson represents with the digraph /iw/, as in 𐑿, /yiw/, 'you,' and 𐑿𐑔, /yiwð/, 'youth.'[6]

In the consonant system Robinson classifies the dental fricative as the 'greater obstrict' of the 'inner region'; that is, he suggests that [ð] and [θ] have a place of articulation the same as, or near, [y], [g], [k], and [ŋ]. This curious classification may be accounted for on the basis of desire for a symmetrical system, which demanded a velar or palatal fricative to go with the stops, nasal and glide.[7]

Perhaps the most outstanding feature of Robinson's system is his use of 'aspiration' to indicate devoicing of consonants. It is this feature of his alphabet that is phonologically the most interesting, suggesting as it does the marking of the voiceless consonants and the Prague-school archiphoneme. Robinson's discussion of 'vitall sound,' or voice, makes it clear that he wishes to separate it from the articulatory descriptions. The traditional term for voiceless consonants used by classical grammarians was <u>aspirata</u>, aspirates (Dobson, 1947: 38). The significance of this aspect of Robinson's alphabet will be discussed further below.

We cannot, as Dobson observes, conclude that this use of aspiration means that Robinson had observed and was recording the aspiration of initial voiceless stops in English, as did Fiedler (1936: 8), for Robinson in theory and practice applies 'aspiration' to all consonants, including nasals. Fiedler, working without the benefit of Robinson's extensive transcriptions, cannot see how Robinson applies his system, and therefore falls into many errors in interpreting it. In fact, Robinson takes as his phonological unit the syllable, and he applies devoicing, or 'aspiration' to entire syllable-initial and syllable-final consonant clusters. A diacritic  placed over the syllable-initial cluster indicates initial devoicing, and a diacritic  , also placed over the syllable-initial consonant, indicates final devoicing. A diacritic  over the initial consonant indicates that both the initial and final consonants or clusters are devoiced. For example, 'sing' is  /ziŋ/; 'write' is  /rei:d/; and 'quite' is  /gwei:d/. Initial [h] is indicated by the initial aspiration mark over the initial vowel (like initial 'rough breathing' in Greek), as in  /evn/ 'heaven.' The grave accent indicates an unstressed syllable, and an acute accent a stressed syllable. Figure 8 gives Robinson's transcription of Richard Barnfield's <u>Lady pecunia</u> (from Bodleian MS. Ashmole 1153), along with my own transliteration of Robinson's script. A transliteration of a larger portion of Robinson's transcription follows at the end of this chapter.

Robinson's Transcription



Transliteration

godez ɔv gowld, gre:d embrez ɔv de erd,
o: dɔw dad ganzd duw ɔ:l diŋz under evn :
dad duwzd gonverd de zadezd mei:nd du mird :
(ɔv wo:m de elder a:dyy wɔz gwei:d be:re:vn)
ɔv di: ei:l ziŋ, and in dei: brai:z ei:l rei:d;
yiw gowldn andyyelz elb mi duw indei:d.

Figure 8

The Second Stanza of Lady Pecunia

All consonants and consonant clusters in Robinson's system are voiced unless they are marked with the aspirate, which in this use is a devoicing marker, as opposed to its use as initial aspiration (above). Although this treatment of voiceless consonants gives rise to some problems, which are discussed below, it has certain interesting implications as well.

Robinson's brief and often ambiguous descriptions of the 'simple' sounds of his system do not give any clue as to the abstractness of his system. Indeed, it is highly unlikely that any notion of abstractness occurred to him, although his system is in fact an abstract one.

Robinson's system and descriptions make it possible to consider the consonants as segments defined with phonological features like 'bilabial stop' ('mute, outer region,' in Robinson's terminology) at an abstract level, to which voice is automatically supplied at a more concrete level unless they are marked with aspiration, which blocks voicing.

It is Robinson's practice in transcribing that suggests this notion, rather than the difficult and murky descriptions of 'vitall sound' and of the aspirate that he gives in The Art of Pronuntiation. We must agree with Dobson (1947: 38) that 'Robinson nowhere gives any explicit sign that he recognized the voicing of consonants. . . .' However, if we follow Dobson in assuming that the transcriptions are somewhat later than the book, it is possible that Robinson refined some of his ideas through practice, and that the

reformulated ideas were either not written down or, if they were recorded, were lost. He may have devised the system of the transcription as a refinement of the ideas expressed in the book.

The inadequacy of Robinson's system to represent early Modern English pronunciation led to a number of inconsistencies in both theory and application. His omission of at least one long vowel, [u:], and perhaps another, [y:], has been mentioned, as has his classification of /ɑ/ as a consonant made in 'the inner region' of the mouth. These seem to be the result of a desire for a symmetrical system, as I have said above.

Robinson's notation for the vowels seems adequate with the exception of the vowels mentioned above, which Robinson represents with the digraphs ƨr, /uw/, for [u:] and ɐr, /iw/, for the possible [y:]. His transcriptions for [ew] and [ɔw] seem to be accurate (Dobson, 1947: 41), but his phonetic description does not admit them as diphthongs. All diphthongs, Robinson says, end 'in the place of the last long vowel,' or /i:/. This eliminates any diphthong ending in a back or labial glide and raises the question of the phonetic quality of those ending in front glides--does Robinson mean that the diphthongs end in a long vowel, or just that the final position of the tongue is the same as that of /i:/? The diphthongs which developed from ME ai, oi, and ī, transcribed by Robinson /ai:/, /ɔi:/ and /ei:/, respectively, do now and in all probability did in Robinson's pronunciation end in a high front glide whose tongue position was that of long, or

tense, [i:]. We may therefore follow Dobson (1947: 42) in his suggestion that we take Robinson literally at his word that these diphthongs end in the place of /i:/, not in the vowel itself.

If Robinson considered neither [ew] and [ɔw] nor his apparently mistaken transcriptions of /iw/ (for [y:]) and /uw/ (for [u:]) to be diphthongs, it is impossible to be certain, from the evidence we have, what he did consider them to be. He may have been misled by conventional orthography, as Dobson suspects and as his transcription and phonetics suggest, to consider them as vowel plus consonant. Or it may be, and this must be speculation, that Robinson's evident desire for symmetry and consistency, which led him in the first place to the /iw/ and /uw/ transcriptions for sounds which were not diphthongs (vowels with on or off-glides), led him likewise to consider /ew/ and /ɔw/ as not being diphthongs.[8]

Two other peculiarities of Robinson's transcriptions of vowels should be mentioned: that for the reflex of ME ī and that for the inflected -es ending of nouns and verbs. Robinson transcribes /ei:/ for ME ī, but the pronunciation he is recording may have had a more centralized vowel, perhaps near [ej].[9] Robinson consistently transcribes final -es as /e:z/; this seems to suggest that the unstressed vowel in this position had taken the quality (not the length or tenseness of 'long' e--that is, it was higher and more fronted than 'short' e (Dobson, 1947: 42-43). Perhaps it

approached current English high central [ɨ], which occurs in this position.

A curiosity of Robinson's consonant system is his analysis of [š] and [ž] into three distinct segments, /yzy/ (XOX, voiced or voiceless, in Robinson's symbols). He 'abbreviates' these sounds as XX, /yy/, with or without voice, as in EVVXXZZO, /andyyelz/, 'angels.' The system Robinson sets up has three regions or places of articulation for consonants, and all three regions were taken by the other 'greater obstricts' /v/, /z/, and /d/. Faced with the prospect of having a fourth place of articulation for only one kind of consonant, Robinson may have resorted to the same tactic he had used in his transcription of [u:] as /uw/, analyzing a single segment into several segments which were already accounted for in his system (see Dobson, 1947: 37-38, for other possible reasons for this analysis).

A further difficulty with Robinson's representation of consonants lies in his distinction of voicing. The aspirate mark applied to consonant clusters is clearly inadequate to express the phonetics of English, although it is a very economical way of representing clusters like initial st- (as in stay) or final -s (as in cats and dogs) in which voice is homorganic. The advantage of the system is much diminished by the fact that it completely devoices the r in stray, which is partially voiced.

The same kind of problem arises when a syllable-final consonant cluster consists of a nasal followed by one or

more voiceless obstruents. The transcriptions of length, amongst, thinks, and banks are marked as unvoiced syllable final, while the nasals were probably partially voiced then as they are today. It is also impossible to tell from the transcriptions ꞗ for kn-, as in know, or ꞗ for wh-, as in what, whether Robinson's pronunciation was [hn] and [hw] or voiceless [n̥] and [w̥] (Dobson, 1947: 39-40).

The formidable appearance of Robinson's alphabet presents a possible difficulty. The visual impact of Robinson's transcription makes immediately clear the price he paid for any advantage of using arbitrary symbols. The difficulty of learning to read his script is considerably greater for a reader already familiar with the Latin alphabet than that of learning the Greek or Russian alphabets. It is comparable to the task of learning Arabic script, the forms of which are so different from the Roman alphabet as to appear arbitrary.[10]

It should be noted that the faults of the system discussed above are of two different sorts. One kind of problem arises from the attempt to fit a square peg into a round hole, as it were. Robinson's concern for the symmetry of his system led to the inconsistent handling of sounds like [u:], perhaps [y:], the diphthongs [ɔw] and [ew], and the consonants [tš] and [ʒ], and the odd classification of the consonants [ɑ] and [θ].

The other fault, that of voicing in consonant clusters, results from insufficient phonetic refinement of the system or from a confusion of phonetic and phonological functions.

In this case, the system works as far as it goes, but it does not go far enough. Whether the analysis is correct or not, and whether Robinson correctly observed the phonetic data or not, the system does work to an extent and could be adjusted by the addition of low-level phonetic rules to represent the pronunciation accurately.

Judged in terms of Robinson's declared intention to create an international phonetic alphabet, the alphabet and system of transcription that he employs have all the faults detailed above. However, his system as phonology, rather than phonetics, has much to recommend it. The system provides a system of articulatory features for vowels and consonants, and an abstract devoicing device. In its marking of stress as a phonetic feature, the system also suggests that Robinson may have been conscious of vowel reduction in unstressed syllables.[11]

The features for consonants are almost identical to those used in traditional phoneme charts. The places of articulation are the 'outer,' 'middle' and 'inner' regions, corresponding to labial, alveolar, and palatal-velar places of articulation. The manners of articulation are 'mute,' 'semimute,' 'greater obstrict,' ' lesser obstrict,' and 'peculiar,' corresponding to stop, nasal, fricative, glide and resonant combined, and lateral. 'Peculiar' as a feature serves to differentiate the sound in question, [l], from the others, not to define its manner of articulation; this lack of phonetic information is no doubt what led Robinson to

give this sound the clearest articulatory description of any sound in his system.[12]

The features for vowels are somewhat less satisfactory. Vowels are assigned to one of five places of articulation, back to front, and may be long or short. It is evident from his use of the 'long' vowel as the offglide of the diphthong in /ˊgwei:d/ 'quite,' and in the -es plural ending as in /ˊgrɔˊze:z/ 'crosses,' that he was also making the tense-lax distinction on which vowel length in English depends. The tenseness of the long vowels is responsible for their height, and it is the place of articulation, rather than the length, that is apparently indicated by Robinson's use of long vowels in these positions.

Robinson's use of aspiration as a devoicing agent as well as a syllable-initial consonant suggests that Robinson confuses devoicing and 'rough breathing' because the term aspiration can be used to describe rough breathing and, as a legacy of classical grammarians (mentioned above), to describe voiceless consonants. Robinson may well have noticed the aspiration of initial voiceless stops, and his treatment of consonant clusters suggests that he was most likely aware of homorganic voice--or, in Robinson's system, homorganic devoicing--of clusters.

Whatever the reason for aspiration as a devoicing agent, its use produces a phonology in which devoicing is a prosodic feature and voicing is the preferred state of all speech consonant clusters. As suggested above, when this system goes

too far in devoicing clusters with nasals and resonants, as in stray and length, these nasals and resonants could be partially revoiced with a lower-level phonetic rule, or by a less broad interpretation of the degree of aspiration. Nothing in Robinson's system suggests that he thought of this kind of rule, but there is some evidence from his marking of stress that he thought of vowel reduction as a phonetic process below the level of abstraction of his representation.

At first glance, Robinson's use of the acute accent for strong stress and the grave accent mark for weak stress seems hit or miss, applied to some words but not to others, but closer examination reveals a certain consistency in the marking of stress. Heavy stress is marked only on polysyllables which begin with an unstressed syllable, like /be:giwnyiá:/ 'Pecunia,' /amerigá:/ 'America,' and /gɔnverd/ 'convert.' Monosyllables are never marked for stress. Weak stress is marked only on unstressed syllables where one might expect to find a reduced vowel, as in /rɔ̀zamond/ 'Rosamond,' /gɔ̀des/ 'goddess,' and /ùnder/ 'under.' Robinson's alphabet includes no symbols for [ə] or [ɨ], the graded vowels of English. His use of weak stress marking seems to be an attempt to indicate that the vowel in the syllable so marked is different from the same vowel under stress; that is, that the vowels in syllables so marked are reduced.

The shortcomings of Robinson's system as a phonetic representation of English have been discussed above. Its shortcomings as a phonological system are incompleteness and inconsistency. As a phonologist, Robinson is three hundred years ahead of his time, so it is perhaps unfair to expect him to produce anything like a consistent phonological theory. He has too few features for a complete phonetic theory, and no clear distinction between phonetic and phonological aspects of his system. It may be of some benefit, however, to reexamine Robinson's circumstances and intentions in light of his accomplishments.

When Robinson errs, it is on the side of oversimplification. He has too few features to account for the sounds of English, and he tries to make one feature, aspiration, work on more than one level. This evidence, combined with his claim to be dealing with every simple sound in man's voice, and to be concerned with every part of man's voice, suggests that his governing principle was that of economy. He was trying to formulate the fewest possible features to account for the sounds of English. The fewest possible distinctive features should lead to a phonetics like that of Jakobson. The fewest possible relationships among phonetic segments should lead to a phonemics like that of the Prague school. Robinson is evidently concerned with features and relationships, if we can judge from his arrangement of 'simple sounds' on a grid of features (Figure 7 above), and his system is very nearly a demonstration of the notion of

phonemic voice in English proposed in Chapter IV.

Robinson's system is not remarkable in taking the syllable as the basic unit of phonetics or phonology; analysis of the syllable was the legacy of classical metrics. The system is remarkable in combining the notion of the syllable with the notions of initial and final consonant clusters and the prosodic application of voice (or devoicing) and accent, and, in the application of these features, in the presence of neutralized elements (any consonant), or archiphonemics, at an abstract level.

It is difficult and dangerous to attribute motivations to a man about whom we know as little as we do about Robinson. He may have been motivated purely by pedagogical impulses in the design of his system. In this case the voicing of nasals and resonants in words like stray and length would be be taken care of by native speaker competence.

Whatever the motives for its design, Robinson's system seems to be a first approximation of a phonology of English. We can only wonder in what directions the elements of his phonology may have been developed by the older Robinson: into phonetics, phonemics, morphophonemics, or all three.

Notes

[1]This attempt to make an entirely strange alphabet is most likely pedagogically motivated--an attempt to prevent language learners from being confused by previous associations with conventional spellings. This suggests that in the design of the appearance of the alphabet, Robinson may have had literate foreigners in mind, rather than preliterate children.

[2]We can speculate that the striking similarities among the symbols for stops and nasals reflect Robinson's having noticed the fairly obvious phenomenon of homorganic nasals in English (and other languages) in words like impossible and intolerable.

[3]Professor William J. Sullivan has suggested that this graphic similarity may reflect the automatic velar coarticulation with v in many dialects of English.

[4]This evidence of a knowledge of Greek, if Robinson was a Cambridge man, could help to associate him with the controversy which surrounded Smith and Cheke at Cambridge, and which must have been at least remembered in Robinson's time.

[5]Wolfe (1972) feels that Robinson's transcription of /uw/ may have reflected his real pronunciation, an advanced example of diphthongization.

[6]It is not my purpose in this chapter to consider the evidence for Robinson's pronunciation of English, but to consider the system and implications of his alphabet. Its evidence for Robinson's pronunciation has been explored by Dobson (1947, 1957).

[7]Professor William J. Sullivan has suggested that Robinson may have been expressing an awareness of the compact-diffuse feature distinction in English.

[8]The question here is one of classification, not one of phonetics and phonology. Robinson seems to ignore these diphthongs as diphthongs in order to make them fit into his system more neatly.

[9]Dobson (1968) argues for a centralized vowel. For a discussion of the full ramifications of the problem, see Wolfe (1972).

[10]In all fairness, this difficulty stems from the fact that a known language, for which a script is also known, is being presented in another, unfamiliar script. For a child learning to read or for a speaker of a language with a non-alphabetic script, Robinson's alphabet would undoubtedly be no more formidable in appearance than any other, and it would be easier to learn because it is more consistent than the English spelling system. This ease is suggested by Robinson's success in teaching young children to read--if Charles Hoole's Robert Robinson (mentioned above) is the same as ours.

The formidable appearance of the alphabet to speakers and readers of English, however, was apparently responsible for the neglect that the book suffered from the seventeenth to the twentieth century. We know from Dobson (1947: 26-27) that the manuscript of Robinson's transcription of Lady Pecunia was called 'Barnfield's ciphers,' and that its preservation was probably due to its occult appearance because its collector, Elias Ashmole, was interested in Rosicrucianism.

[11]This use of stress marking parallels the use of devoicing at the level of the archiphoneme. That is, reduced vowels in Robinson's system occur when they are marked at an abstract level by a grave accent. This features is not applied as consistently as devoicing.

[12]Robinson may also have noticed that [l] is the most differentiated of all the English consonant phonemes, in terms of phonetic context.

Robinson's Transcription
of Barnfield's Lady Pecunia

la:di be:giwnyia:

ɔr

ðe brai:z ɔv muni

1.

ei: ziŋ nɔd ɔv andyyeliga ðe vai:r
(vɔr wo:m ðe baladi:n ɔv vrɔ:nz vel mad
nɔr ɔv zwi:d rɔzamond, ɔwld dlivɔrdz a:r;
wuz de:ð did ma:g ðe zegɔnd enri zad)
bud ɔv ðe va:rezd va:r be:giwynia;
ðe va:muz gwi:n ɔv ridyy ameriga:.

2.

gɔdez ɔv gɔwld, gre:d embrez ɔv ðe erð,
o: ðɔw ðad ganzd duw ɔ:l diŋz under evn :
ðad duwzd gonverd ðe zadezd mei:nd du mirð :
(ɔv wo:m ðe elder a:dyy wɔz gweid:d be:re:vn)
ɔv ði: ei:l ziŋ , and in ðei: brai:z ei:l rei:d;
yiw gɔwldn andyyelz elb mi duw indei:d.

3.

yiw, yiw alo:n, gan ma:g mei: miwz du zbe:g;
and del a gɔwlʻdn da:l wiđ zilver duŋ;
yiw o:nli gan mei: ble:ziŋ zei:lenz bre:g;
and ad zum miwzig duw a meri zɔŋ;
bud amuŋzd ɔ:l đe vei:v in miwzigz ard,
ei: wurzd gan bruwg đe gɔwnder-denɔrz bard.

4.

de ma:n iz bezd, and đad ei: ma:n du gi:b,
zo: yyɔ:l ei: gi:b mei:zelv vrum đad ei: ma:n;
le:zd wiđ zum uđerz, ei: bi vo:rzd du wi:b
and grei: bega:vei:, in a do:lvul ze:n.
bud du đe mader widyy ei: a:v in and
đe la:di re:dyyend, bo:d bei: ze: and land,

5.

wen za:durn livd, and wo:r de giŋli grɔwn,
and dyyo:v wɔz yed unbɔrn, bud nɔd unbred,
điz la:diz va:m wɔz đen ɔv no: re:nɔwn;
vɔr gɔwld wɔz đen no: mo:r e:zdi:md đen le:d :
đen driwđ and ɔnezdi we:r o:nli iwzd,
zilver and gɔwld we:r uderlei: re:viwzd.

6.

bud wen ðe wurld griw wie:zer in gɔnzai:d
and zo: ɔw men in manerz did de:dlei:n,
ɔw dyyaridi be:gan du luwz ur e:d,
and o:n did ad anuðerz gud re:bei:n,
ðen did ðe a:dyyed vurzd ɔv ɔ:l re:zbegd ur,
and vɔwd frɔm ðenzvo:rð never du re:dyyegd ur.

7.

ðuz wið ðe wurld ur bewdi did ingre:z,
and ma:ni ziwderz ad yyi duw ɔbdai:n ur :
zum zɔ:wd ur in ðe warz, and zum in be:z;
bud vew ɔv yiwðvul a:dyy guwld ever gai:n ur :
or iv ða: did, yyi zuwn wɔz gɔn agai:n,
and gɔwld wið ðem bud lidl dei:m re:mai:n.

8.

vɔr wei: agá:nzd ðe na:diwr ɔv ur zegz
(ðad gɔmɔnlei: de:zbei:z ðe vi:bl ɔwld)
yyi: luvz ɔwld men : bud yuŋmen yyi: re:dyyegdz
be:gɔ:z duw ur ðe:r luv is gwigli gɔwld :
ɔwld men (lei:g uzbandz dyyeluz ɔv ðe:r wei:vz)
lɔg ur ub vazd, and gi:b ur az ðe:r lei:vz.

9.

ðe yuŋman ga:rlez du mai:ndai:n iz lei:v
neglegdz ur luv (az ðɔ:w i: did abɔr ur)
lei:g o:n ðad ardli duwd ɔbdai:n a wei:v
and wen i: a:ð ur o:nz, i: ga:rz nɔd vɔr ur,
yyi: zi:iŋ ðad ðe yuŋman duwð de:zbeiz ur,
le:vz ðe vrang ard, and vlei:z undu ðe mei:zer.

10.

i: enderdai:nz ur, wið a dyyɔi:vul ard,
and zi:mz du riw ur undezerved rɔŋ:
and vrɔm iz brezenz yyi: yyɔ:l nevar bard,
ɔr iv yyi: duw, i: ðiŋgz ur abzenz lɔŋ;
and vdn dei:mz i: zendz vɔr ur agai:n,
wo:z lei:v wiðɔwd ur, ganɔd lɔŋ re:mai:n.

11.

and wen i: a:ð ur in iz o:n bɔzeyyɔn;
i: lɔgz ur in an ei:rn bared dyyezd;
and d wdiŋ zumwad, ɔv ðe lei:g dranzgreyyɔn,
i: ɔwldz ðad ei:rn wɔ:led brizn bezd.
and le:zd zum ruzdi zignez yyɔwld invegd ur,
i: ɔvdn vizidz ur, and duwð re:zbegd ur.

12.

az vɔr ðe yuŋman (zubdyyegd undu zin)

no: marvel ðɔ:w ði divl duw dizdrez im;

du dembd manz vrai:ldi, widyy duwð never lin,

wo: ma:ni dei:mz a:ð nɔd a grɔz du blez im :

bud ɔw gan i: ingur ðe evnz gurz,

ðad a:d zo:mani grɔze:z in iz burz?

13.

i: ni:dz nɔd ve:rðo:z wiged zbrei:dz ðad wɔ:lg,

under ðe guverdiwr ɔv go:l blag nei:d;

vɔr wei: ðe divl zdil a grɔz duwð bɔ:lg,

be:gɔ:z ɔn id wɔz aŋg ðe lɔrd ɔv lei:d :

bud led nɔd mei:zerz druzd du zilver grɔze:z,

le:zd in ðe end ðe:r gai:nz bi: durnd du lɔze:z.

14.

bud wɔd ga:r ðai:, zo: ðai: ma: o:rd ub gɔwld?

e:ðer vɔr gɔd, ɔr divl, ɔr evn ɔr el?

zo: ðai: ma: va:r be:giwnyia:z va:z be:ɔwld;

and evri da: ðe:r mɔwndz ɔv muni del,

wɔd ðo: du gɔwnd de:r gɔi:n ðai: never lin,

gɔwnd ðai: ðe:r gɔi:n, and gɔwndz nɔd gɔd ðe:r zin?

15.

bud wɔd dɔ:lg ei: ɔv zin du iwzererz?
ɔr luwg vɔr mendmend ad a mei:zerz and?
be:giwnyia: a:ð zo:ma:ni vɔlo:erz,
buwdlez id iz ur bɔwer duw wiðzdand.
giŋ guvedei:z and wa:rinez iz wei:v,
ðe ba:rendz we:r ðad vurzd did giv ur lei:v.

16.

bud nɔw unduw ur brai:z ei: wil bro:zi:d,
widyy iz az ambl az ðe wurld iz weid :
wɔd gre:d gɔndendment duwð ur brezenz bri:d
in im ðad gan iz weld wið wizdum gei:d?
yyi: iz ði zuvren gwi:n ɔv ɔ:l de:lei:dz :
vɔr ur ðe lɔ:yer ble:dz, ðe zo:ldyer vei:dz.

Lady Pecunia goes on to fifty-seven stanzas--342 lines.

CONCLUSION

ALPHABETIC WRITING AND THE PHONEME

Phonological theorists have tended to associate alphabetic writing with phonological segments at the level of abstraction most fully developed in their theories. Thus traditional phonemicists claimed that alphabetic writing was phonemic. Generative theorists, rejecting the phoneme, conclude that alphabetic writing is closer to the more abstract phonological representation. Indeed, generative linguists have declared as an orthographic principle that writing should not reflect morphophonemic variation; in the generative framework this would make writing phonetic.

Stratificational grammar, with segments defined at two well-defined levels of abstraction is less likely to have an orthographic principle declared like that of generative phonology. Theorists will tend to see alphabetic writing as phonemic, like that of Czech, or morphophonemic (morphonic) like that of Russian or English.

English spelling certainly does reflect the generative orthographic principle to the extent that it is morphophonemic. It is morphemic to the extent that it distinguishes homophones like bear and bare (Klima's criterion of adequate expressiveness). The phonological representation of English is conservative, reflecting late Middle English phonetics

(Chomsky and Halle, 1968). In late Middle English, then, the spelling apparently corresponded to the phonemic, or to the systematic phonetic, level. The phonology of English has changed a great deal, but the spelling system very little, so that English spelling now corresponds to a more abstract level of the phonology.

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